THESIS

FOR THE AWARD OF DEGREE OF

MASTER OF SURGERY (General Surgery)

SESSION 2020-2023

"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HAEMORRHOIDECTOMY VS MIPH"

DR. SAYANDEEP MAITY

SANTOSH DEEMED TO BE UNIVERSITY
NO. 1, SANTOSH NAGAR,
GHAZIABAD-201009, NCR DELHI, INDIA

DEPARTMENT OF GENERAL SURGERY
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I, **Dr. Sayandeep Maity**, hereby declare that the present thesis titled **"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HAEMORRHOIDECTOMY VS MIPH"** done under the guidance of **Dr. Shalabh Gupta** at Santosh Deemed to be University, is a bonafide/original research work. I also hereby do declare that there are less than 10% similarities with other published research works and the present research work has not been submitted for the award of any degree/diploma in the same institution where the work has been carried out or at any other institutions.

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Prof. (Dr.) Jyoti Batra,

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"**I have had dreams and I have had nightmares, but I have conquered my nightmares because of my dreams**"

-Dr. Jonas Salk

After completing my M.B.B.S in the year 2017, I waited almost 3 years before getting selected for post graduation course in this institute. Being inspired by my father from a very young age, I have had a very specific dream about being a not only a doctor but to become a surgeon. That's why, when I got chance into Santosh Medical College and Hospital in my dream branch, the far distance, different language, an unknown environment and fully fledged COVID blizzard didn't deter me from coming here. Though the never-before-seen COVID situation made our life as junior residents, extremely difficult, it taught us a great deal about public health, treatment of critical patients, patient-doctor relationship, attenders counseling and hard work, empathy, compassion as in general.

I am deeply humbled and immensely grateful to my guide ***Prof. (Dr.) Shalabh Gupta*** *for the help, mentorship and valuable inputs, he offered to me and my colleagues regarding the thesis and during the entire tenure of post graduation. I am grateful for his unvarying support, timely counsel, meticulous inspection, scientific approach and scholarly advice and guidance throughout my post-graduation which has helped me accomplish this research. He has always been approachable, understanding, calm and reasonable to our problems and with nippy and witty solutions for the same.*

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Dr. AnuVibhu, Dr. Kasif Saikh Sahajada and Dr. Aparajeeta Kumar *for their support and valuable comments. They also have been role models in many ways commendable with learning in every step of our journey in this institution thus leaving a long lasting impression on our mind and soul.*

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exceptionally enlightening few years of my small life. Their love and blessings always helped me and kept my dreams alive.

No study can be completed without the co-operation of the patients involved and hence I express my sincere thanks and respect to all my patients from whom I have learned so much during this research. Their righteous feedbacks have been the true essence of my research.

Above all, I look on to our divine GOD, the almighty for giving me this opportunity and blessed me with such empowering teachers, impactful institution, caring parents, kind friends, intellectual prowess and necessary skills in order to accomplish this herculean task with relative ease.

Dr. Sayandeep Maity

(2020-2021)

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INTRODUCTION

INTRODUCTION

Haemorrhoids are very common in day-to-day general surgery practice. They may be primarily due to human evolution, natural consequences of adaptation of erect posture by mankind, straining to expel constipated stool or secondarily due to carcinoma of rectum, pregnancy, uterine tumor, and chronic constipation, urinary obstruction due to stricture or enlarged prostate and portal hypertension.

The prevalence of symptomatic haemorrhoids is calculated to be at 4.4% all over world. It is important to note, while haemorrhoids do not typically affect one gender more than other, women are more prone to report the presence of haemorrhoids to their doctor than men. The ASCRS (American Society of Colon and Rectal Surgeons) estimates that less than 10% of the haemorrhoid cases require surgery overall. After a conventional (Ferguson's) haemorrhoidectomy, a repeat surgery was necessary in 0.8% of cases in large series whereas, in a study with a minimum follow-up of 5 years, recurrence rate was 18.2% and re-operation was performed in 7.2% case of stapled haemorrhoidopexy.

Another classification tells us the grading of the haemorrhoids ranging from grade I, being only symptomatic bleeding, to grade IV which are permanently prolapsed haemorrhoids. The third type of classification determines haemorrhoids by their anatomical position, where 3, 7 and 11 o'clock are considered to be primary and the areas in between to be secondary.

Though grade I and grade II haemorrhoids, can be treated conservatively, whereas grades III and IV require surgical interventions in order to treat the condition. Open haemorrhoidectomy has long been regarded by the patients as an inherently painful procedure. Reduction of pain after haemorrhoidectomy is an important goal, with the ultimate aim of reduction in the length of hospital stay and the possibility of day care surgery.

Haemorrhoidectomy by conventional technique causes considerable post-operative pain, post-operative bleeding and longer time for return to normal life. MIPH (Minimal Invasive Procedure for Haemorrhoids) is a newer concept which is used to overcome these problems. Stapled haemorrhoidopexy for prolapsing haemorrhoids is having different mechanism of action from excisional haemorrhoidectomy. It is not associated with the pain which is an usual occurrence after resection of the sensitive anoderm. Both procedures are effective in treating

grade 3 and 4 haemorrhoids; however they both present with specific pros and cons, for which it is better to judge every case on individual basis.

Despite its prevalence and low mortality, haemorrhoidal diseases have a high impact on quality of life, and can be managed with a multitude of surgical and nonsurgical approaches.

Symptomatic haemorrhoids are one of the commonest surgical afflictions of the Indian population. For grade I and II haemorrhoids conservative medical therapy is usually successful but grade III and IV haemorrhoids require surgical intervention. The non-operative options ranges from rubber band ligation, sclerotherapy, cryotherapy to photocoagulation. However, haemorrhoidectomy of the Milligan and Morgan variety (open haemorrhoidectomy) or the Ferguson variety (closed haemorrhoidectomy) remains the gold standard. Recently stapled haemorrhoidectomy (MIPH) for prolapsed haemorrhoids has come into play but has not gained wide spread popularity because of technical and cost considerations.

A modified electro-surgical device, the Ligasure™ (Valleylab, Boulder, CO, USA) has recently made available for the last decade or so as a 'vessel-sealing system'. This system delivers electric energy across it jaws much like a bipolar diathermy device with minimal lateral spread of current or heat along with constant pressure. This very effective mechanism of action enables the user of Ligasure to seal off any vessel up to a caliber of 7 mm in a single go. This Ligasure device could be used for haemorrhoidectomy in grade III and IV haemorrhoids known as Ligasure Haemorrhoidectomy and many studies are being conducted comparing their results with conventional haemorrhoidectomy and also with MIPH.

Haemorrhoids are usually stratified by the grade of prolapse of the internal component, as suggested by Goligher,[1] and they can also be classified in internal, external, or mixed or interno-external type.[2] According to grade and affection, a number of different treatments can be offered to patients, starting by conservative measures such as diet and lifestyle modifications for the initial stages of the disease.[3]

However, for more advanced stages, particularly in patients with Grade III–IV internal haemorrhoids, there is a lack of consensus about the best treatment. Even though conventional surgery is an option and has the benefit of resolving both external and internal components when present, such procedures may be associated with pain and late return to normal activities.[4]

For this reason, a number of less invasive procedures have been described, including rubber band ligation for Grade II–III internal haemorrhoids, stapled haemorrhoidopexy, and Doppler-guided haemorrhoidal artery ligation,[5] among others. However, none of these procedures is completely effective to treat the external haemorrhoids, and to complete the procedure, excision of the external component must be added.[6] Even though this prevents postoperative symptomatic recurrences, it also carries along more morbidity and pain during the postoperative period, which ultimately is the same concern surgeons have with the conventional haemorrhoidectomy.

AIMS AND OBJECTIVES

AIM AND OBJECTIVES

Aim:

To analyze and compare various peri-operative factors in patients suffering from haemorrhoids, undergoing conventional haemorrhoidectomy or Minimal Invasive Procedure for Haemorrhoids (MIPH).

Objectives:

To compare on the two groups on basis of the following points

1. Duration of operation.
2. Bleeding during operation by counting the blood soaked gauzes used.
3. Any instrumental malfunction during operation.
4. Presence of post-operative haemorrhage.
5. Occurrence of retention of urine in post-operative period.
6. Post-operative comfort of the patient by calculating VAS (Visual Analogue Scale) scoring on post-operative day 1 & 7.
7. Need and duration for IV analgesic usage in post-operative period.
8. Duration of hospital stay required.
9. Early post-operative complications on post-operative day 7 (bleeding P/R, prolapse, discharge, incontinence or infection etc).
10. Delayed post-operative complications on post-operative day 30 (recurrence and stricture/stenosis of anal canal).

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Anatomy

The anal canal passes from pelvic diaphragm downwards and backwards for 4 cm in adults as direct but narrower extension of the rectum to end at the anal verge. The puborectalis, part of the funnel-shaped pelvic diaphragm, maintains the angle between the anal canal and rectum. It's an important component of the continence mechanism.

The external sphincter is the composite striated muscle forming the bulk of anal sphincter complex. It's traditionally divided into superficial, deep and subcutaneous portions. Being a somatic voluntary muscle, the external sphincter is red in colour and innervated by the pudental nerve. The inter-sphincteric space is of important clinical significance for location of the inters-phincteric anal glands and passage for spread of pus.

The longitudinal muscle is a direct continuation of the smooth muscle of the outer coat of the rectum, augmented in its upper part by striated muscle fibers originating from the medial component of the pelvic floor. Most of the muscle continues caudally before splitting into multiple terminal septa that surround the muscle bundle of the subcutaneous portion of the external sphincter, to insert into the skin of the most caudal portion of the anal canal and its surrounding skin. Milligan and Morgan named the medial most of these septa passing around the inferior border of the internal sphincter, the anal intermuscular septum. As well as providing a supportive network for anal canal, it also flattens the anal cushions during defecation.

The internal sphincter is the distal condensation of the smooth muscles of the bowel wall of approximately 2-5mm thickness. This involuntary muscle commences where the rectum passes the pelvic diaphragm and ends above the anal orifice, its lower border is palpable at the inter-sphincteric groove, below lies the most superficial fibers of the external sphincter separated by the anal inter-muscular septum. Although, innervated by autonomic nervous system, it receives intrinsic fibers from non-adrenergic and non-cholinergic (NANC) fibers, stimulation of which releases nitric oxide causing in turn sphincter relaxation.

There is a notable change in the lining of the anal dentate line. Below this line it is modified skin or anoderm, consisting of squamous epithelium, but above this line there is single

layer of columnar epithelium similar to the all other part of the GIT covering the sub-mucosa, except a 1 cm area known as transitional zone above the dentate line.

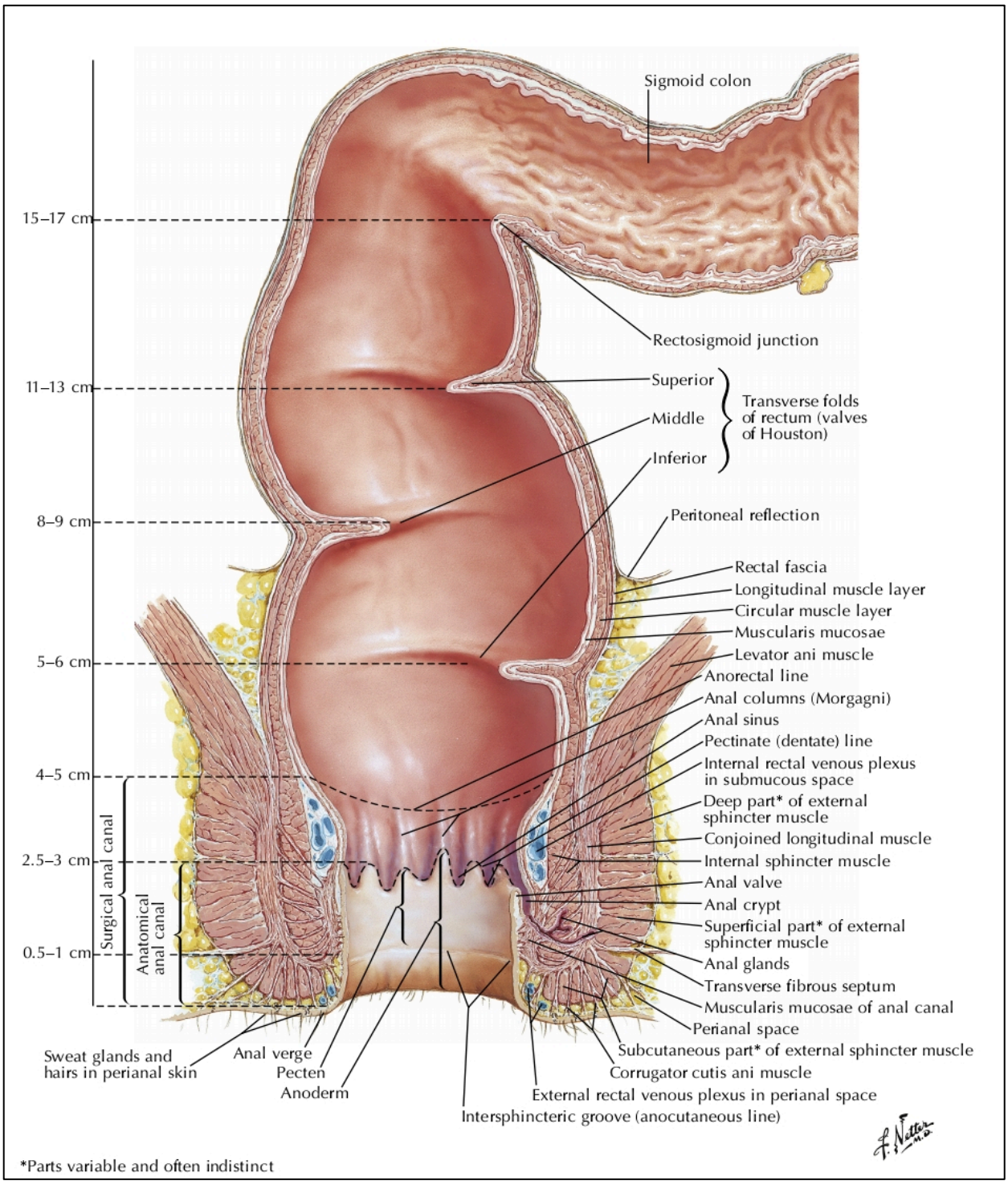


Fig 1: Anatomy of rectum and anal canal

The anoderm is devoid of any skin appendages like hair follicles and sweat glands. The mucosa & submucosa above the dentate is uneven and thrown into folds known as anal cushions. These are clinically present at left lateral, right antero-lateral and right postero-lateral (3, 7 and 11 o'clock) position. The secondary folds (the rectal columns of Morgagni) lie both over and between the primary folds. The innervations above the dentate line is visceral whereas below it is somatic, which is very pertinent to all anorectal surgeries.

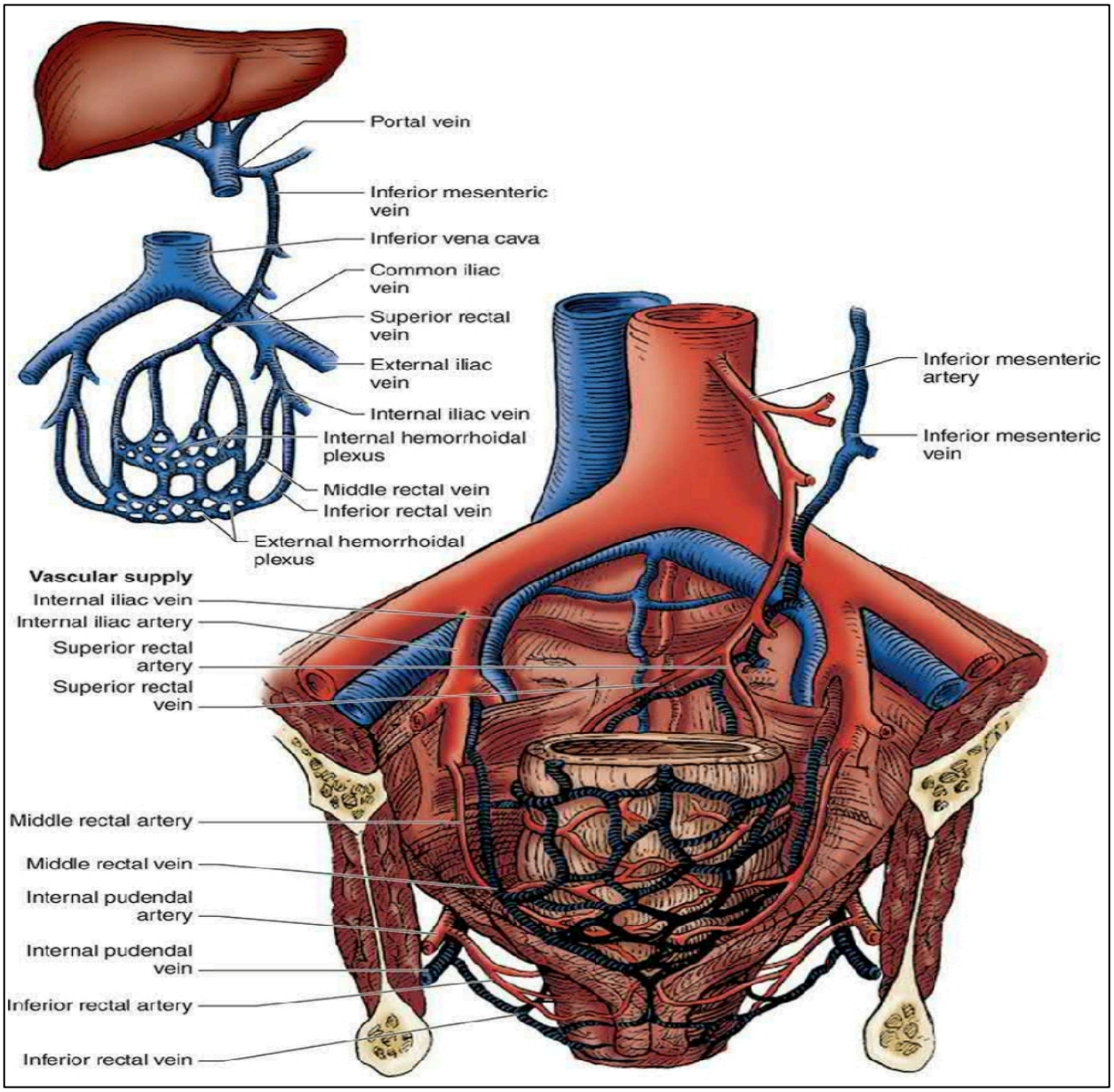


Fig 2: Arterial and venous supply of rectum and anal canal

The anal canal is supplied by 3 arteries – firstly, superior rectal artery, end branch of inferior mesenteric artery, secondly, middle rectal artery, branch of anterior division of internal iliac artery and lastly, inferior rectal artery, branch of internal pudental artery.

The venous drainage follows the same patterns of arterial distribution. The upper half of the anal canal is drained by the superior rectal vein, tributaries of the inferior mesenteric vein and the middle rectal veins, which drain into internal iliac veins. The inferior rectal veins drain the lower half of the anal canal which joins the internal iliac veins on each side. The anastomosis of superior and other 2 veins form the porto-systemic anastomosis. This explains any portal hypertension could be transmitted to these capillaries making them engorged.

The upper half of the anal canal is drained into postrectal lymph nodes and the lower half is drained into superficial and deep inguinal lymph nodes which is of particular interest incase of carcinoma anal canal.

Physiology

Defecation is a complex interaction of reflex sphincter and pelvic floor relaxation associated with propulsive peristaltic wave to evacuate feces and flatus. Moreover, voluntary straining increases intra abdominal pressure to overcome difficulties due to poor sphincter or pelvic floor relaxation, to an inadequate peristaltic wave or to a disproportionate large stool. The patients with ‘Obstructed Defecation Syndrome’ complain of incapacitating evacuatory problems with tenesmus.

Continence is also complex, as it is a balance between the effectiveness of the anal sphincters and the pressure that they have to withstand. Sphincter pressures naturally decline with the age as muscle fibers are replaced with fibrous tissue, also affecting the pelvic floor muscles. Passive continence is the ability to resist passive leakage of the rectal contents. Leakage can occur without any major peristaltic wave and is prevented by an effective anal seal and resting anal pressure.

Anal squeeze pressure is the maximum voluntary pressure that the patient can exert to close the anal canal and thus is important to delay a call for defecation than maintaining a

passive continence. The voluntary increase in the pressure is mainly produced by the external sphincter supplemented by the pelvic floor muscles.

Patho-physiology

Haemorrhoids are non-pathological cushions of over distended vascular tissue/plexus which stretches the over lying mucosa and anoderm, loosening their attachments to the muscle wall of the anal canal. Microscopically, they are characterized as sinusoids because they lack muscle layer.[7] Several anatomic investigations have confirmed the existence of arterio-venous communications between vessels, which clarify why haemorrhoidal bleeding is bright red and has the same pH as arterial blood.

Internal haemorrhoids are situated above the dentate line and are typically painless due to visceral innervations. They are covered by single layer columnar epitheliums and are classified based on the degree of protrusion via the anal canal. Only engorged bluish vessels without any noticeable prolapse are characterized grade 1 haemorrhoids. Grade 2 haemorrhoids prolapse on Valsalva maneuver or exertion but spontaneously reduce. Grade 3 haemorrhoids also prolapse with Valsalva maneuver or exertion but are needed to be manually reduced.[8] Grade 4 haemorrhoids are chronically prolapsed and cannot be reduced manually. Thus, the grade 4 haemorrhoids are very prone to complications such as strangulation, ulceration, gangrene etc. External haemorrhoids are covered in specialized skin of anal canal known as anoderm and are always below the dentate line. They are sensitive to touch, stretch, and temperature due to somatic their nerve innervations.[9]

Haemorrhoids are cushion sinusoids which are hypothesized to function as a part of the continence mechanism and aid in complete sir tight closure of the anal canal at rest.[10] The major cushions lie at the left lateral, right anterio-lateral and right postero-lateral portions of the anal canal which is usually expressed as 3,7 and 11 o'clock position of anal canal, imagining the side towards symphysis pubis as 12 o'clock and the side towards coccyx as 6 o'clock. Secondary cushions may be present. Bleeding and thrombosis of the pre-sinusoidal arterioles may go in hand in hand with prolapse.

Fig 3: External haemorrhoids

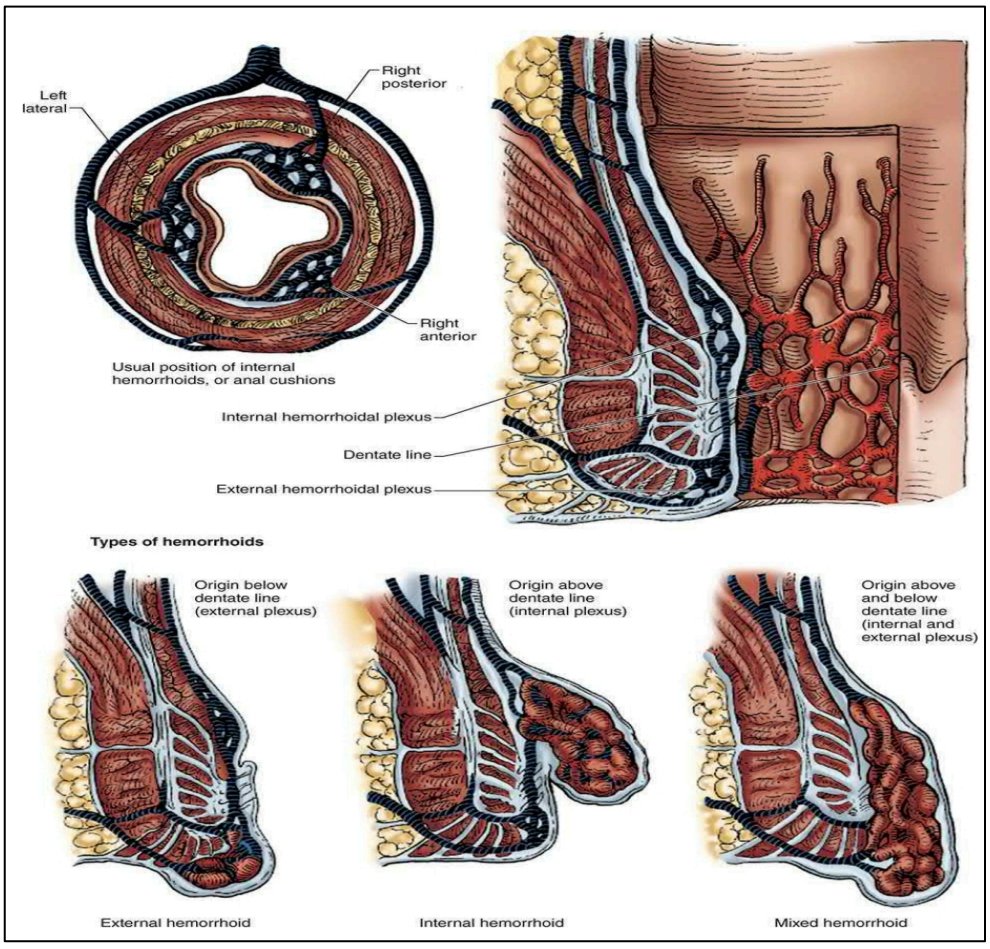


Fig 4: Locations and classifications of haemorrhoids

There are multiple proposed theories for development of haemorrhoids. Relationship between portal hypertension, human's upright posture and raised abdominal pressures have been associated with its development since long. Some school of thoughts advocate for theory of infections, low proportion of fiber content in diet or anal hypertonia. Ageing also imparts some effect in the pathophysiology. Proposed etiological factors include constipation, prolonged straining, pregnancy, obesity, hereditary, derangement of the internal anal sphincter, weak blood vessels and absent valves in the portal vein. The most recent theory is that shearing forces acting on the anus for a variety of reasons, lead to caudal displacement of the anal cushion and mucosal trauma. With time, fragmentation of supporting structures due to ageing and other causes, leads to loss of elasticity of the cushions such that they become prolapsed. Despite several studies, the pathogenesis of haemorrhoids still not fully understood and are still subjected to a lot of debates.[11]

Clinical Features

Bleeding is the most common presenting symptom of haemorrhoidal disease. It usually presents as bright red fresh bleeding, recognized first on the toilet paper with defecation and later becoming heavier and noticed in the toilet. With time, bleeding may become entirely unrelated to defecation. [12]

Prolapse of internal haemorrhoids is highly characteristic of more advanced and chronic haemorrhoidal disease. The prolapsed internal haemorrhoids may reduce spontaneously or may require manual reduction. In rare cases, they may prolapse through the anal canal outside the anal sphincter and get incarcerated.

In the absence of thrombosis or incarceration, haemorrhoids are usually painless. Dull pain after defecation is common with prolapsed haemorrhoids and is relieved by reducing the prolapse. If someone is experiencing severe pain, a complication of haemorrhoids or another diagnosis, such as anal fissure, abscess, or rectal ulceration, must be considered. [13]

Patients may experience mucoid anal discharge or fecal soiling as internal haemorrhoids prolapse through the anal canal hampering air tight seal of anal canal. Thus, irritation of the perianal skin by the mucoid anal discharge can result in significant pruritis which would the primary complains of a patient.

Complications of haemorrhoids ranges from strangulation and thrombosis, ulceration, fibrosis to more dreaded ones like gangrene and portal pyaemia.

Diagnosis

The diagnosis of haemorrhoids is essentially stands on proper history taking and judicious clinical examination. A patient complaining of painless fresh bleeding per rectum usually during defecation with or without mass per rectum should indicate the clinician towards the diagnosis. On digital rectal examination/DRE with proctoscopy should reveal multiple bluish polypoidal mass in the anal canal which may or may not have active bleeding. The colonoscopy which is not done on the regular basis may sometimes be required in some doubtful cases.

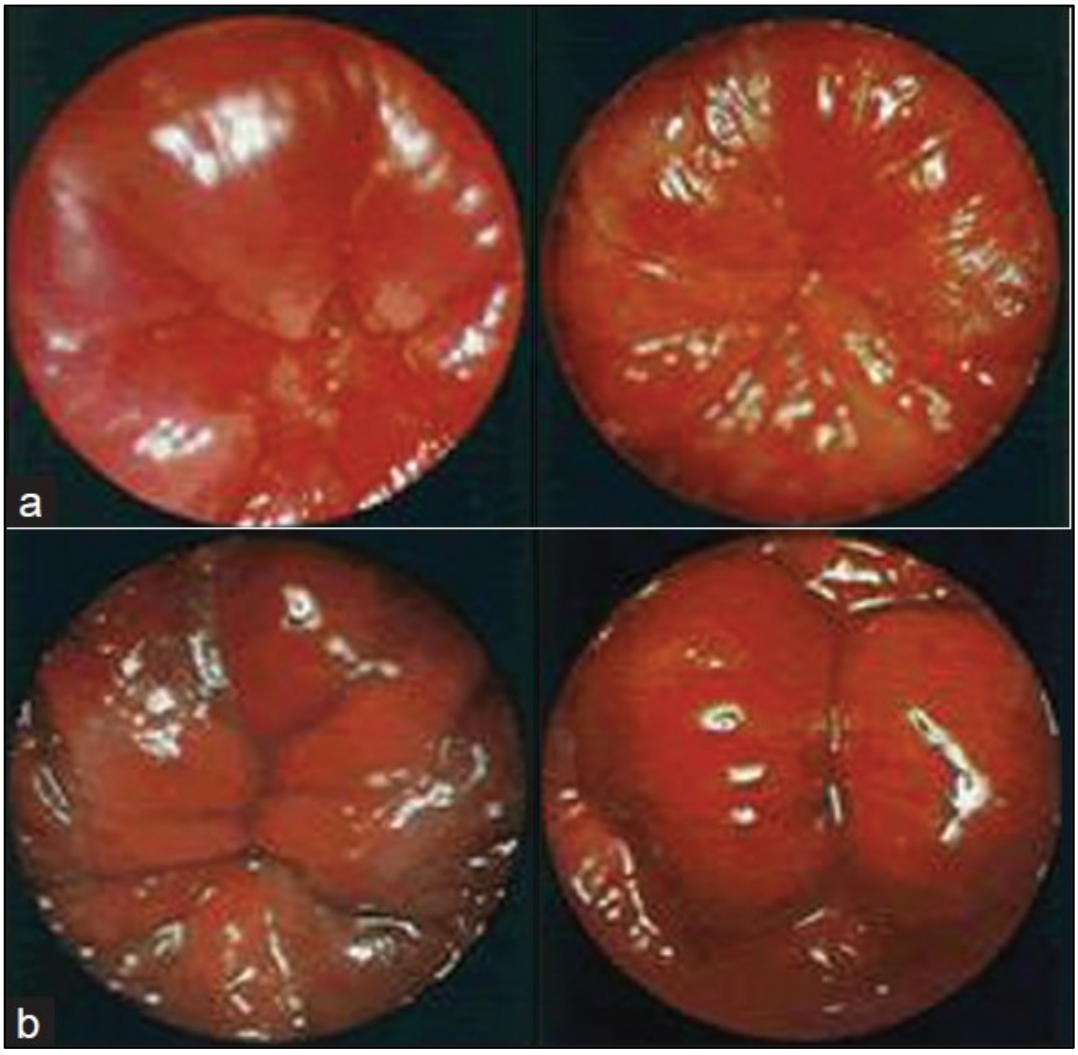


Fig 5: Proctoscopic view of grade 1, 2, 3 and 4 internal haemorrhoids

Though these findings are pretty confirmatory but the other probable causes should always be kept in mind. Any patient with massive lower GI haemorrhage should be resuscitated and then evaluated for the causality. For certain instances, the guidelines are already laid; any elderly person above the age of 50 years with bleeding per rectum should undergo a mandatory screening colonoscopy and/or CECT whole abdomen to rule out colon or rectal cancer. Same way younger patients with severe anaemia without any actively bleeding haemorrhoids ought to be investigated for various pathologies like angiodyplasias, diverticulitis or bleeding dyscresias etc.

Classifications

Haemorrhoids can either be external or internal. The external haemorrhoids is covered by specialized anal skin devoid of any hair follicles or sebaceous glands known as anoderm below the dentate line, while the internal variety lies above the dentate line. Combination of the two varieties constitutes intero-external haemorrhoids which start as an internal one then progress externally.

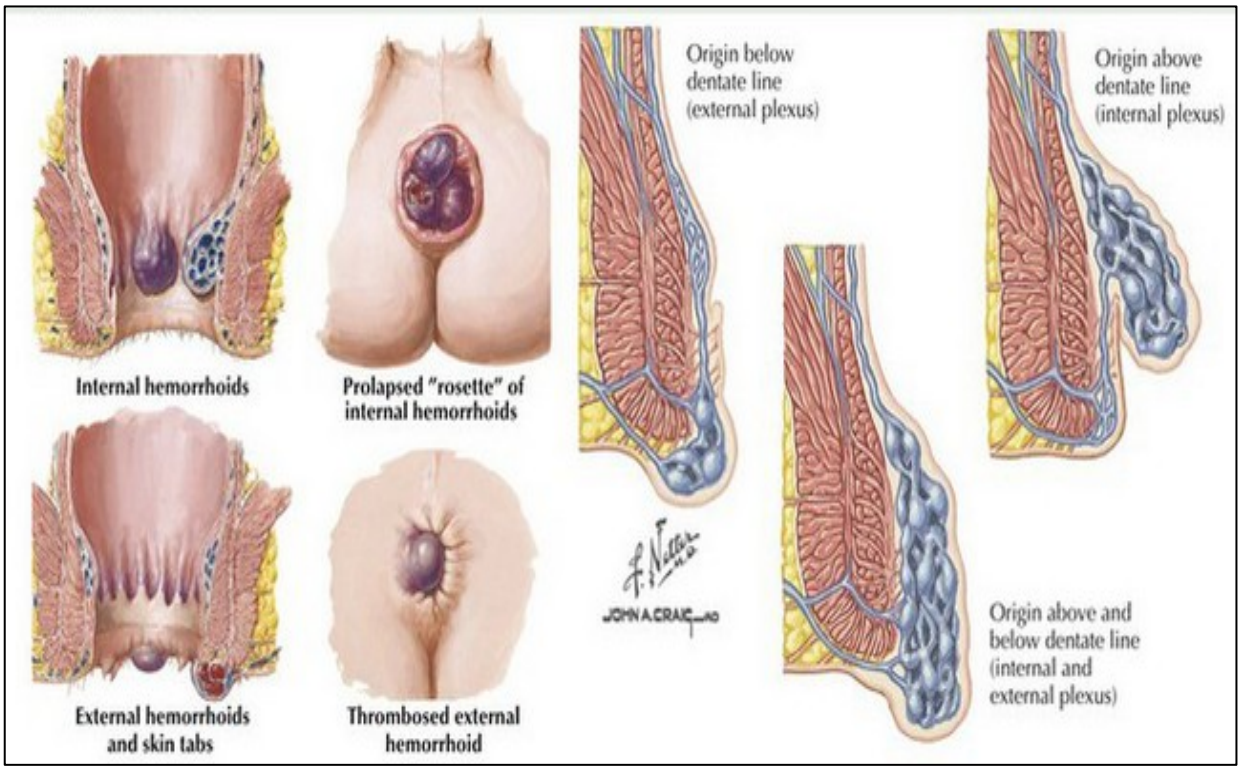

Internal hemorrhoids
Prolapsed "rosette" of internal hemorrhoids
Origin below dentate line (external plexus)
Origin above dentate line (internal plexus)
External hemorrhoids and skin tabs
Thrombosed external hemorrhoid
Origin above and below dentate line (internal and external plexus)

Fig 6: Internal and external haemorrhoids in relation to dentate line

Internal haemorrhoids can further classified into the following grades during per rectal examination:

- Grade I — Haemorrhoids which only bleeds, but do not prolapse into the anal canal.
- Grade II — Haemorrhoids prolapse on defecation or straining but reduce back instantaneously on its own.
- Grade III — Haemorrhoids require manual reduction of the patient every times.
- Grade IV — Haemorrhoids which cannot be reduced and permanently prolapsed out of anal orifice.

Differential diagnosis

The clinician should keep the alternative probable differential diagnoses on his mind while examining the patient. These differential diagnoses could be listed as rectal tumor, anal skin tags, fibrous anal polyp, peri-anal hematoma, partial and full thickness rectal prolapse, anal fissure and dermatitis.

Treatment

Prevention is the best mode of treatment for haemorrhoids. The disease once started tends to get bad to worse over time due to its high association with constipation or straining.

Medical management gives option of creams and suppositories which can relieve irritation and pain but only temporarily. A fiber rich non spicy diet and bulk laxatives with plenty of waters prevent constipation and worsening of the disease simultaneously without curing it from its root. The mainstay of treatment therefore is surgical. But unfortunately, operative haemorrhoidectomy is usually associated with significant postoperative complications, including pain, bleeding and anal stricture, which can result in protracted period of convalescence.[14]Therefore, continuing efforts to develop new techniques with minimal pain and faster recovery is encouraged. Recent advances in instrumental technology have armed a surgeon with options of bipolar electro-thermal devices, ultrasonic scalpel, circular stapler and the Ligasure vessel-sealing systems. It is now possible to vaporize haemorrhoids, with the advent of the atomizer wand. Some of the surgical options for treating haemorrhoids include the following:

Non-operative (conservative) options: Rubber band ligation, sclerotherapy, infrared photocoagulation, cryotherapy, manual anal dilatation, LASER haemorrhoidectomy, Doppler-guided haemorrhoidal artery ligation, and the new atomizing technique that uses the atomizer wand to excise and vaporize haemorrhoids.

Most non-operative procedures are reserved for first and second degree haemorrhoids and are usually carried out on outpatient basis.

Operative options include the clamp and cautery haemorrhoidectomy, open haemorrhoidectomy, closed haemorrhoidectomy, sub-mucosal haemorrhoidectomy, whitehead circumferential haemorrhoidectomy, stapled haemorrhoidectomy, radiofrequency ablation and suture fixation haemorrhoidectomy, pile suture' method, the bipolar diathermy haemorrhoidectomy, the Ligasure haemorrhoidectomy and the harmonic ultrasonic scalpel haemorrhoidectomy. Operative haemorrhoidectomies are reserved mainly for third and fourth degree haemorrhoids and second degree haemorrhoid which is not responding to medical managements.

Non-operative procedures

Rubber band ligation (RBL)

Bleeding from first, second and some selected third degree haemorrhoids can be treated by rubber band ligation. In this method, mucosa over the engorged pile mass is selected carefully 1-2 cm above the dentate line and is grasped and pulled into a rubber band applier which now comes up with an attached suction device to secure the pile mass inside the gun properly (Barron gun). Upon firing the gun, the rubber band slips onto the mass of tissue held and strangulates it causing scarring and achieving haemostasis. Generally, only one or two quadrants are banded in a single visit to be mindful of dreaded anal stenosis. No anesthesia is usually required. Results are found to be far superior to those of injection sclerotherapy.

A recent meta-analysis of haemorrhoidal treatment concluded that rubber band ligation was the initial mode of therapy for first to third degree haemorrhoids.[15]

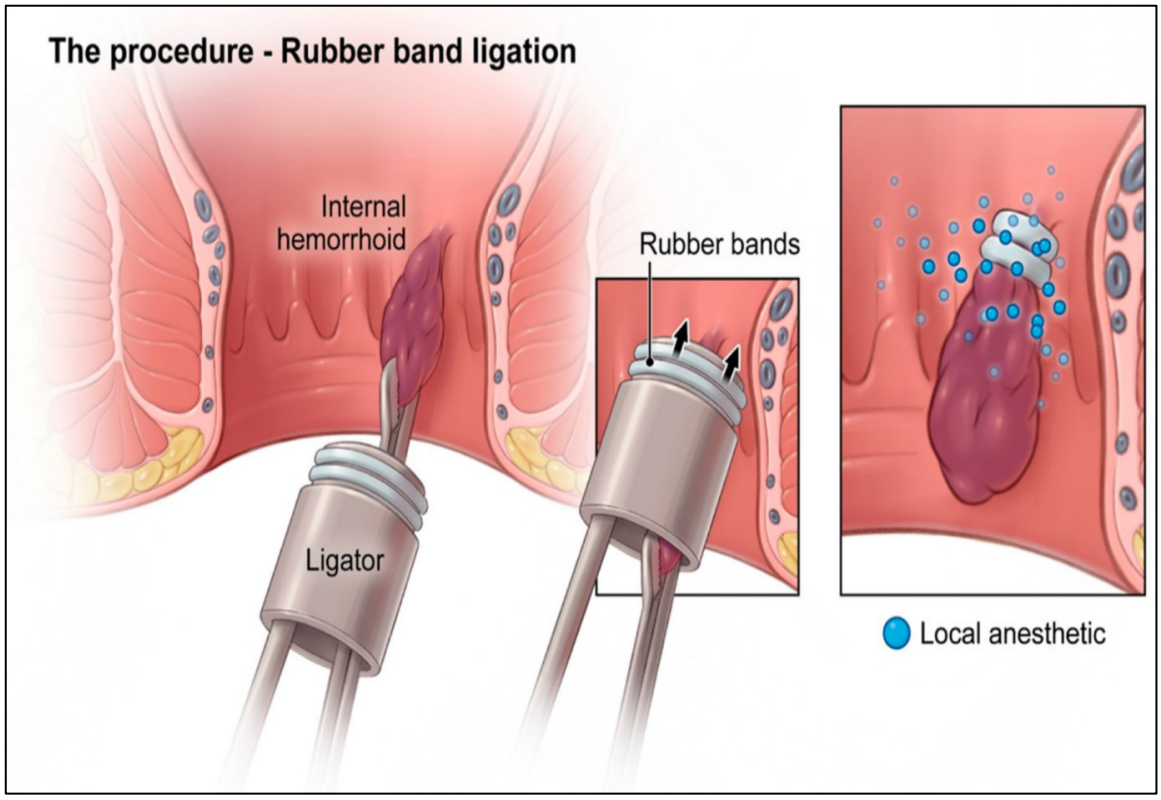


Fig 7: Barron band ligation of haemorrhoids

Injection sclerotherapy (Mitchell technique)

Mitchell (of Illinois, USA) first used carbolic acid for injecting haemorrhoids in 1871.[16] The method offers effective day care treatment for first-, second- and some third-degree haemorrhoids. A quantity of 1-3 ml of a sclerosant which could be 5% phenol in almond or Arachis oil, sodium morrhuate or quinine urea, is injected into the submucosa of each haemorrhoidal mass. The goal is to cause thrombosis of the vessels by inducing inflammatory process by this irritant injection and promote fibrosis, which causes retraction of the prolapsed haemorrhoids. Gabriel's syringe usage should be encouraged at all possible cases. It is specially designed and manufactured to pass through the proctoscope. But readily available disposable syringes have superseded the Gabriel's syringe. 3 injections at 6 week interval is the maximum recommended regime. Complications are rare, but infection and fibrosis have been reported in several case reports.

Infrared photocoagulation (IPC)

Infrared photocoagulation is an effective outpatient treatment for first and second degree haemorrhoids.[17] The infrared probe is applied to the base of the haemorrhoids through a proctoscope to produce a circular burn of 2 mm deep tuning it on for 1 second at each site. Though the results are at par with rubber band ligation and sclerotherapy, it has far greater acceptance in the population for its very minimum pain and discomfort. But once again, the patient would require multiple sessions of photocoagulation making it an expensive procedure.

Cryosurgery

This procedure is indicated for first, second and some selected third degree haemorrhoids. The cryoprobe of liquid nitrogen is applied to the haemorrhoid for about 3 minutes to produce liquefaction of frozen tissue, over the ensuing 2-3 weeks.[18] This procedure is also painless and requires no anesthesia at all, but edema and profuse discharge have been seen in a majority of cases. O'Callaghan *et al*. in 1982 concluded in their studies that cryosurgery gave results similar to those of open haemorrhoidectomy in patients with prolapsing haemorrhoids, but there were fewer complications and shorter hospital stay with cryosurgery.

Manual anal dilatation (Lord's procedure)

This procedure indicated mostly for second and third degree haemorrhoids was advocated by Lord in 1969.during this procedure, it is aimed to stretch the anal sphincters with 4 fingers of each hand of the surgeon making the sphincter relaxed to some extent keeping an cautious eye to overzealous stretching which could damage or tear the sphincter complex. This newly achieved laxity in tone of the sphincter is then maintained by serial dilations. Spinal anesthesia or general anaesthesia is required, but the patient can be discharged on the same day. It's important to note that this procedure has been abandoned sue to frequent problem of incontinence, especially if clubbed with Milligan-Morgan haemorrhoidectomy. [19]

LASER haemorrhoidectomy

The haemorrhoid is vaporized or excised using carbon dioxide or NdYag LASER.[20] The smaller LASER beam allows for precision and accuracy; and, usually, rapid, unimpaired healing. It is painless. LASER therapy may be used adjunct to other modalities also. In a study of 750

patients undergoing LASER treatment for haemorrhoids, 98% successful result was reported. Patient satisfaction was near 100%.[21] It is a day-care procedure reserved mostly for first, second and some third-degree haemorrhoids.

Atomizing haemorrhoids

The atomizer wand utilizes the electrical current innovatively wherein a specialized electrical probe vaporizes one or more cell layers at a time, obliterating haemorrhoids to minute particles of fine mist or spray of carbon and water molecules, which is immediately suctioned in. Results are similar to those of LASER haemorrhoidectomy except that there is less bleeding using the atomizer and that the atomizer costs less. The procedure is suitable for haemorrhoids of grades I, II and III. Patient does not require hospital stay. Presently, atomizing haemorrhoids is offered exclusively in Arizona, USA.[22]

Operative procedures

Now-a-days, surgeons are equipped with multiple operative procedures to suit individual cases.

Indications

So much advancement has been made in this field that a wide range of treatment modality is there to offer to a particular patient depending upon his/her degree of discomfort. The first step of management for haemorrhoidal diseases is to advise the patient to take a large quantity of fibers in diet along with plenty of fluid. Adding 4-5 tsp of fibers which correspond to 20-25 gm of supplemental fiber to the daily diet is recommended by Garg *et al.* to have a proper bowel movement. He also advocates consumption of sufficient amount of water with the dietary fibers to avoid having any abdominal cramps. Thus all the water gets absorbed in the stool precursor making stool soft and alleviate the need of forceful straining. This intervention is evident to stop disease progression and to decrease the size of prolapse.

Rubber band ligation and infrared coagulation are reserved for mainly grade one and two haemorrhoids when non operative methods fail. The recommended number of sessions of RBL is one to two with a wait period of 4 weeks between 2 visitations. When comparing these two minimally invasive procedures, RBL have a better success rate but IFC would cause very

minimal discomfort due to lack of mucopexy during the procedure. Overall, IRC has 4 times the failure rate of the RBL.[23]

Operative haemorrhoidectomy is necessary in the following situations:

1. Failed non-operative management of the second degree haemorrhoids.
2. Advanced disease process unlikely to respond to conservative management like in case of grade 3 and 4.
3. Interno-external haemorrhoids.
4. Incarcerated internal haemorrhoids needing urgent intervention.
5. Anaemic patients requiring definitive management for haemorrhoidal bleeding.
6. Fibrosed haemorrhoids.

Contraindications

Relative contraindications include the following:

1. Patients unable to undergo general/spinal anesthesia due to medical co-morbidities
2. Baseline fecal incontinence.
3. Rectocele.
4. Presence of inflammatory bowel diseases such as Crohn disease or ulcerative colitis.
5. Portal hypertension with rectal varices.
6. Uncontrolled bleeding disorder.

Equipments

The classic instrument used for an excisional haemorrhoidectomy is the scalpel with or without the aid of scissors for dissection. This approach is highly effective and low cost for obvious reasons.

A Hill Ferguson retractor is ideal for visualization the entire length of the haemorrhoidal complex and any other pathology if present and also enables the doctor to intervene..Otherwise a slit anoscope with obturator are usually cheap and effective alternative.

Fig 8: Slit anoscope with obturator

Fig 9: Hil Ferguson retractor

Ligasure and Harmonic scalpels both are modern-day highly advance and precise energy devices which are newly invented. But the superadded cost of the usage of these devices impact the patients deeply especially in our rich poor country. Ligasure is a bipolar cautery device could be employed for both tissue division and coagulation of blood vessels with help of the both direct pressure and modified electro-cautery. The Harmonic scalpel uses a vibrating blade powered by the Piezzo crystals to generate heat for tissue division and coagulation simultaneously. The proposed benefits of using energy devices relative to their cost have not demonstrated significant clinical advantages.

Monopolar electro-cautery is a device capable of superior haemostasis compared with a scalpel. It allows excision of the haemorrhoidal complex without suture ligation, but at the expense of injuring adjacent tissues due to lateral thermal spread.

Now a days, many companies are making PPH gun available to the market with all the necessary parts and sutures in a single package like Ethicon Inc., Meril and Axon.

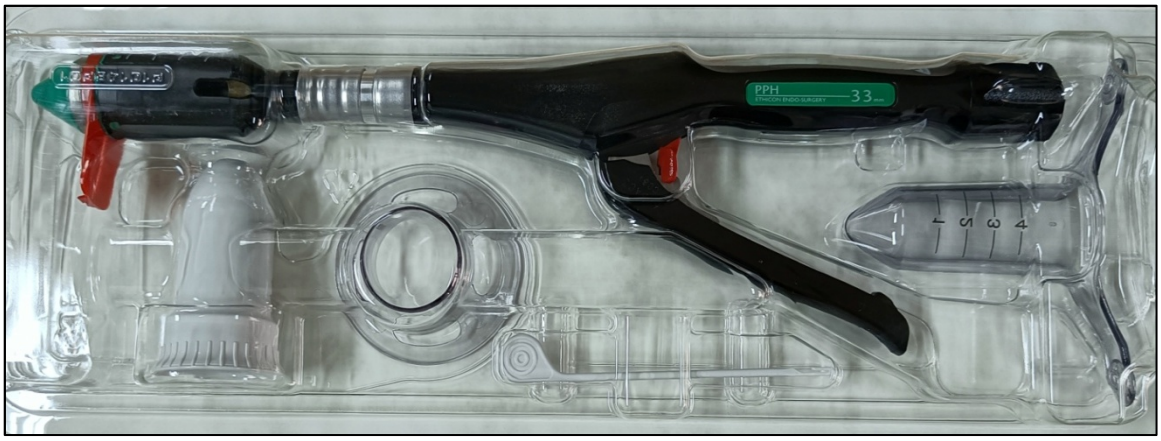


Fig 10: Ethicon PPH gun (J & J)

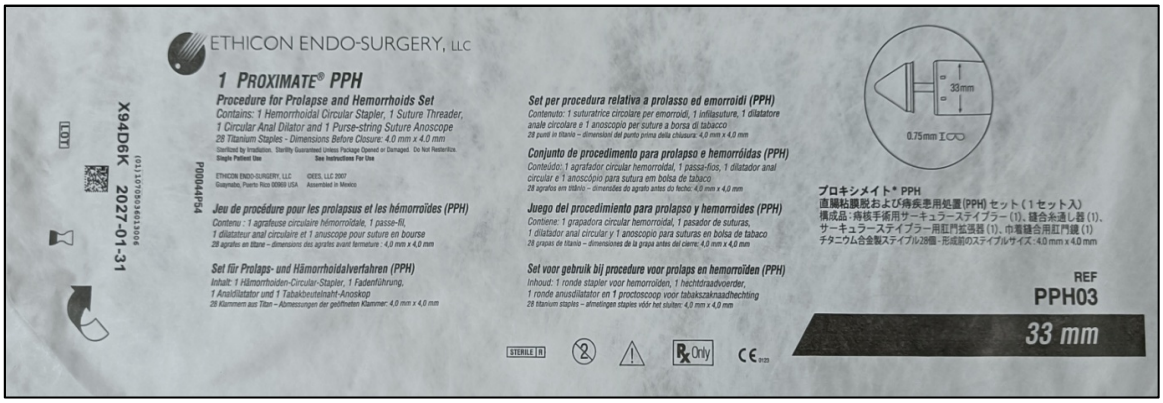
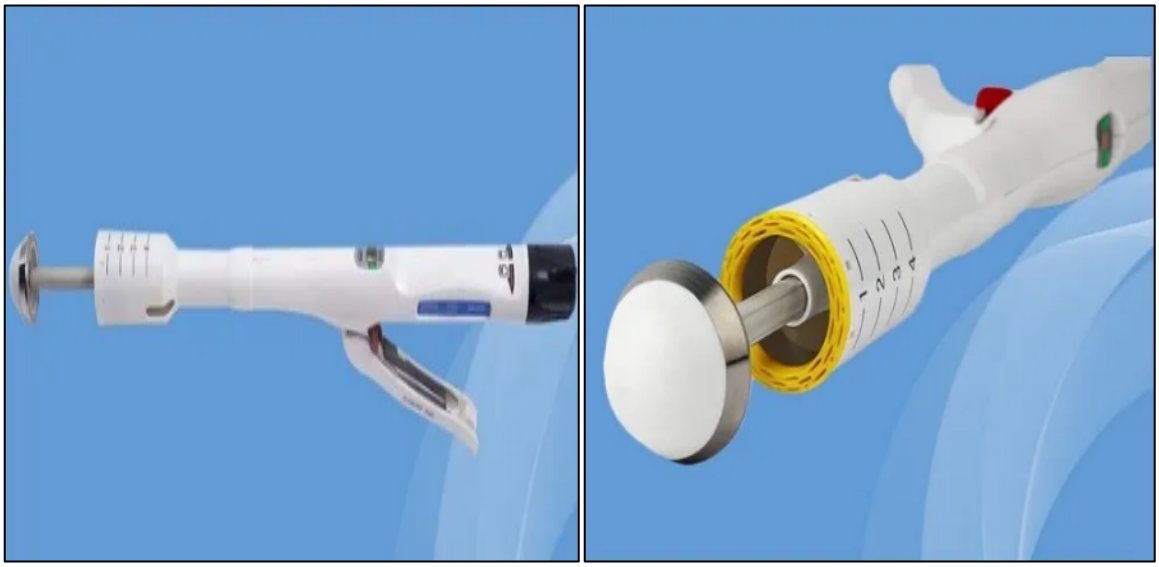
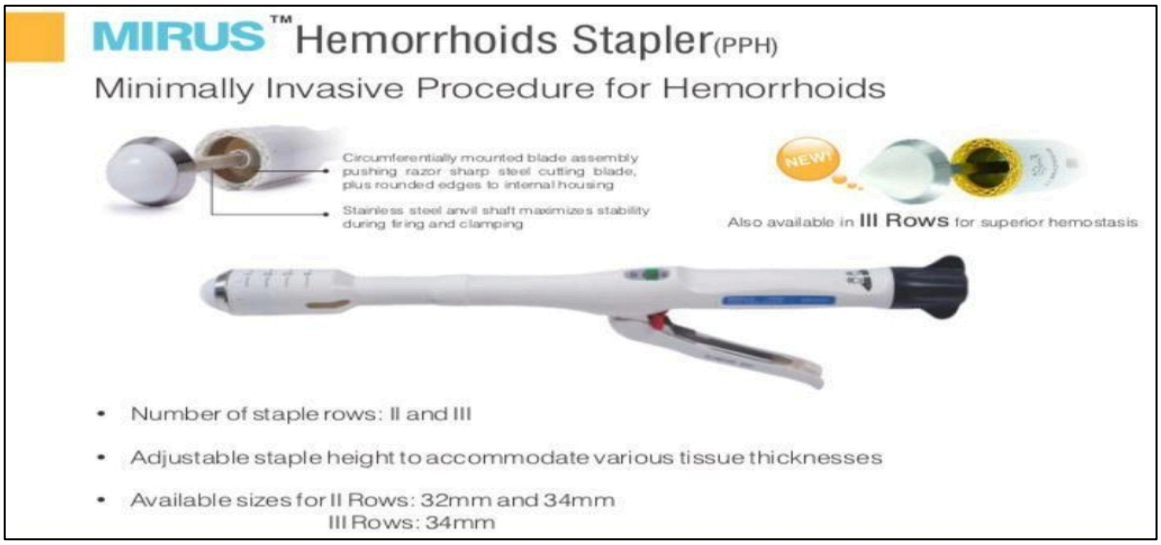

ETHICON ENDO-SURGERY, LLC
1 PROXIMATE® PPH
Procedure for Prolapse and Hemorrhoids Set
Contains: 1 Hemorrhoidal Circular Stapler, 1 Suture Threader, 1 Circular Anal Dilator and 1 Purse-string Suture Anoscope
28 Titanium Staples - Dimensions Before Closure: 4.0 mm x 4.0 mm
Single Patient Use
See Instructions For Use
Set per procedura relativa a prolasso ed emorroidi (PPH)
Conjunto de procedimento para prolapso e hemorróidas (PPH)
Jeu de procédure pour les prolapsus et les hémorroïdes (PPH)
Juego del procedimiento para prolapso y hemorroides (PPH)
Set für Prolaps- und Hämorrhoidalverfahren (PPH)
Set voor gebruik bij procedure voor prolaps en hemorroïden (PPH)
33mm
0.75mm
プロキシメイト® PPH
REF
PPH03
33 mm
X94D6K
2027-01-31
P00044P94
STERILE R
Rx Only

Fig 11: Ethicon PPH gun (J & J)




MIRUS™ Hemorrhoids Stapler (PPH)
Minimally Invasive Procedure for Hemorrhoids
Circumferentially mounted blade assembly pushing razor sharp steel cutting blade, plus rounded edges to internal housing
Stainless steel anvil shaft maximizes stability during firing and clamping
NEW!
Also available in III Rows for superior hemostasis
Number of staple rows: II and III
Adjustable staple height to accommodate various tissue thicknesses
Available sizes for II Rows: 32mm and 34mm
III Rows: 34mm

Figs 12, 13 & 14: MIRUS PPH gun (Meril)

Personals

- Operating surgeon
- First Assistant
- Scrub Nurse
- Anesthesia team

Preparation

Bowel preparation is not recommended now-a-days; however, an enema may be necessary to clear the distal rectum of stool. No preoperative antibiotics are needed. Anesthetic selection should take place via a discussion between the anesthesiologist, the operating surgeon, and the patient. The patient should receive counseling regarding pros and cons of spinal anesthesia. Adequate anaesthesia is essential for any procedure on the sensitive anoderm below the dentate line. For a per-anal procedure in insensitive anus, the role of the anaesthesia is to relax the sphincter.

Precautionary foley's catheterization may be preferred in view for bladder muscle incontinence post spinal anaesthesia, to alleviate the problem of urinary retention due to pain in the operative site and to detect any unlikely injury to the urethra during the surgery at the earliest.

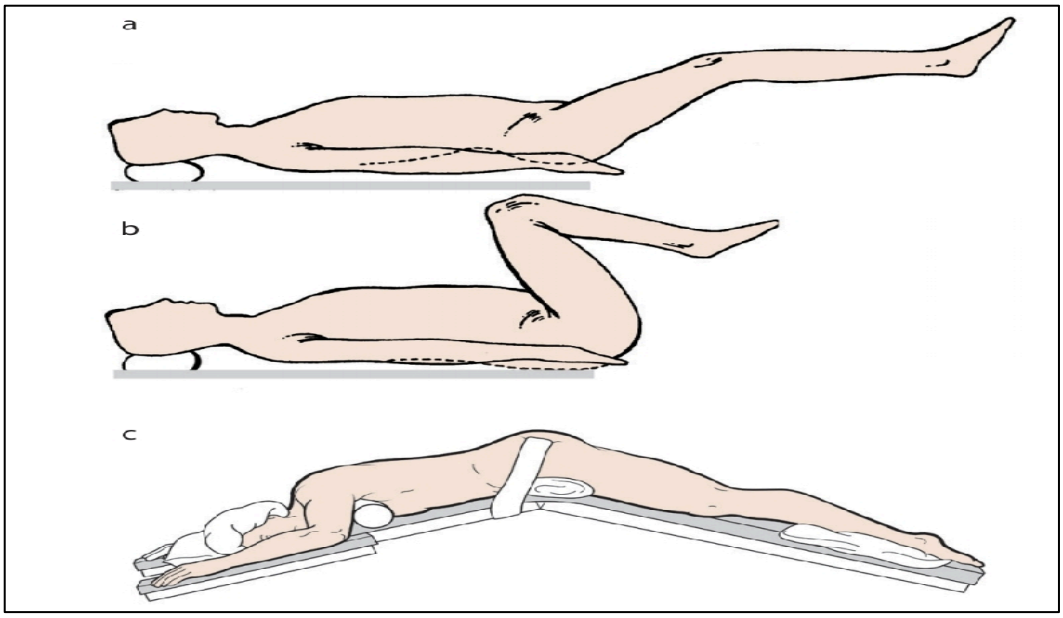


Fig 15: Different position for haemorrhoid surgeries

The Lloyd-David position is suitable for lengthy procedure where abdominal and perineal access would be required. Perineal access is denied when a steep head down is employed. The classical lithotomy position is a better position for any anal dissection, but acute flexion of hip and knee joints is undesirable for any protracted procedure. The position of thighs also restricts any simultaneous pelvic or abdominal access. The prone jack-knife position with buttocks strapped apart affords excellent access to the posterior perineum and anus with less venous congestion. The disadvantages are mainly in turning and ventilation of an anaesthetized patient in this position, which makes it an unattractive option for a short minor procedure.

Clamp and Cautery haemorrhoidectomy

This method is now obsolete but has the advantage in not having any form of dissection of tissue planes. The haemorrhoid is grasped in-between the insulated blades of Smith's pile clamp. The greater part of the haemorrhoid mass is then cut away with scissors, leaving only a stump, which is burned with heated copper cautery to arrest bleeding.[24] The copper cautery is usually heated over a gas ring, which is seldom available in a modern operation theatre today. The electric cautery or diathermy knives are unsatisfactory substitutes because they are ineffective in arresting hemorrhage and because the coagulating current may penetrate tissues too

deeply. The operation is reserved for second- to fourth-degree haemorrhoids and it is done under general anesthesia.

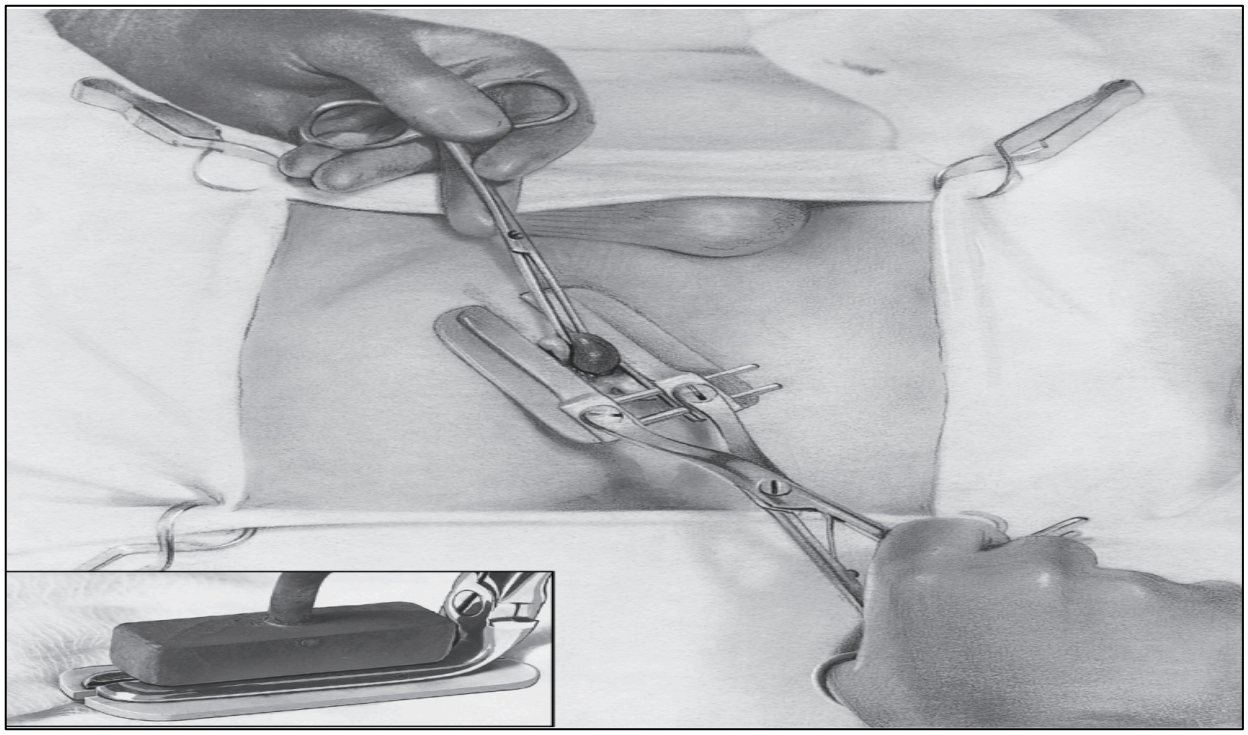


Fig 16: Clamp and cautery haemorrhoidectomy

Open haemorrhoidectomy (Milligan-Morgan method)

This is the most commonly used technique and is widely considered to be the most effective surgical technique for treating haemorrhoids.[25] We routinely carry out open haemorrhoidectomy at our center. Adotey and Jebbin in Port Harcourt, Nigeria, showed that open haemorrhoidectomy was the predominant surgical method for treating haemorrhoids.[26] Uba et al. in Jos, Nigeria, also concluded in their studies that open haemorrhoidectomy was safe, simple and cost-effective, with postoperative pain, acute urine retention and bleeding being the commonest complications.[27,28] It is the procedure of choice for third- and fourth-degree haemorrhoids.

Fig 17: Grade 3 haemorrhoid prior surgery

This method was developed in the United Kingdom by Dr. Milligan and Morgan in 1937, mainly for haemorrhoids of grades II-IV.[29] A V-shaped incision by the scalpel in the skin around the base of the haemorrhoid is followed by scissors dissection in the submucous space to strip the entire haemorrhoid from its bed. The dissection is carried cranially to the pedicle, which is ligated with strong catgut and the distal part excised. Other haemorrhoids are similarly treated, leaving a skin bridge in-between to avoid stenosis. The wound is left open and a haemostatic gauze pad left in the anal canal. The procedure is done under general or epidural anesthesia. Postoperative pain and acute urine retention are common complications.

Fig 18 & 19: Retracted grade 3 haemorrhoidbefore and after incision

Fig 20: post operative picture

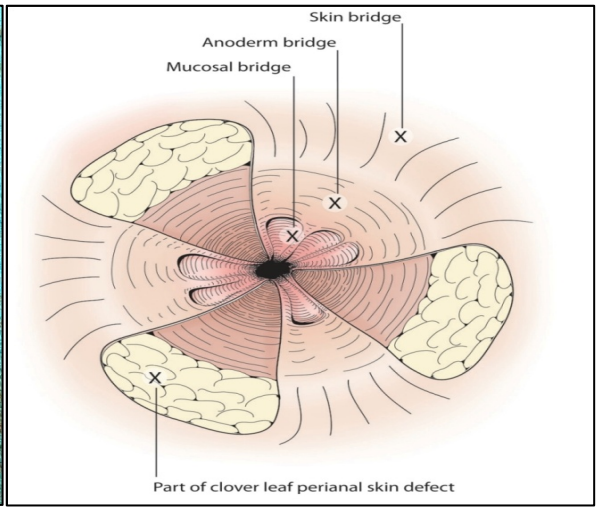


Fig 21: Ideal operative technique

Closed haemorrhoidectomy (Ferguson's technique)

Developed in the United States by Dr. Ferguson and Dr. Heaton in 1952, this is a modification of Milligan-Morgan method described above. The indications for this procedure are similar to those of Milligan-Morgan procedure. Here the incisions are totally or partially closed with absorbable running suture, following surgical excision of the haemorrhoids. The Ferguson method has no advantage in terms of wound healing because of the high rate of suture breakage at bowel movement. There are several modifications of this method.[30]

Fig 22: Pre-op grade 3 haemorrhoids

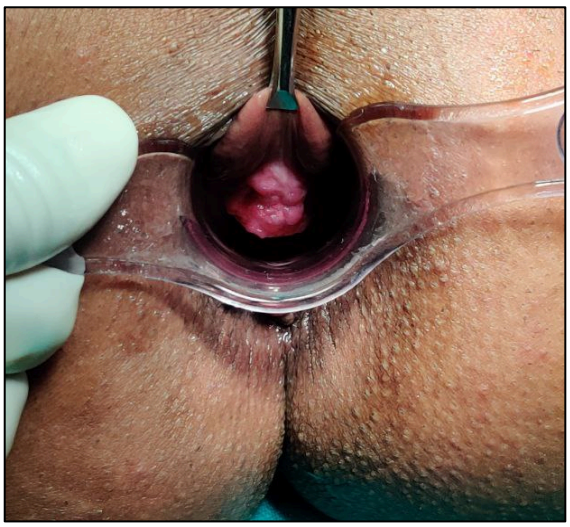


Fig 23: Secured grade 3 internal haemorrhoid

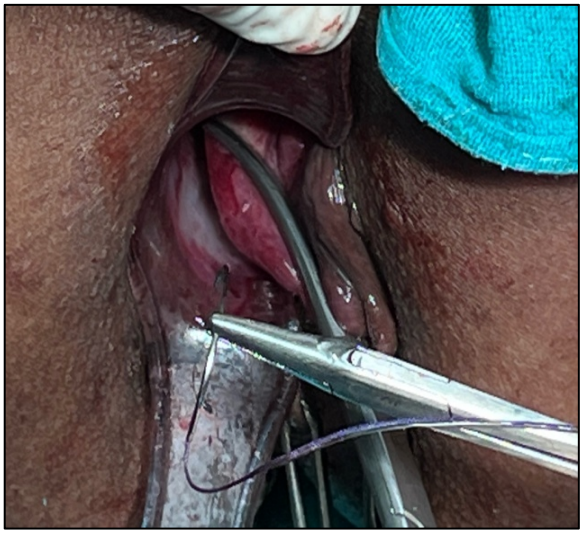


Fig 24: Bite taken through pile mass

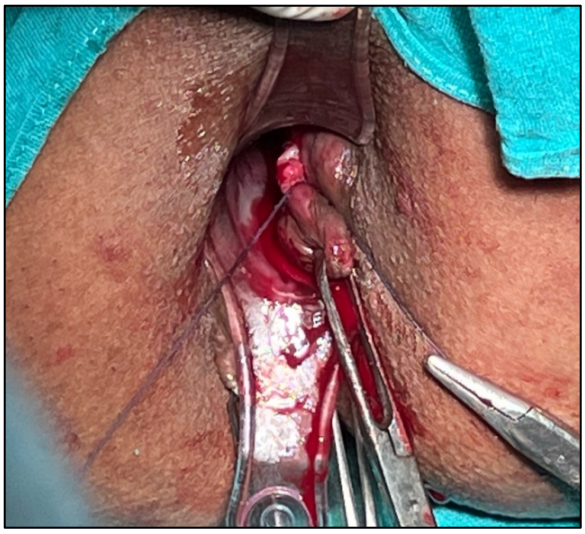


Fig 25: Knot tied around the pile

Fig 26: Raw area secured with a suture

Fig 27: Post-op picture

Sub-mucosal haemorrhoidectomy (Parks procedure)

This procedure was developed in the 1950s by Parks, who published results and details of the technique in 1956.[31] It was designed to reduce postoperative pain and avoid anal and rectal stenosis. It is indicated for second- to fourth-degree haemorrhoids. A Parks retractor is inserted. A point just below the dentate line at the haemorrhoid is grasped with a hemostat. A 30-40–mL saline containing 1:400,000 parts adrenaline is injected sub-mucosally to open up tissue planes

and to reduce bleeding. Scissors are used to excise a small diamond of anal epithelium around the hemostat. The incision is continued cranially for 2.5 cm, creating two mucosal flaps on each side, which are each grasped with further hemostats, and sub-mucosal dissection is commenced to remove the haemorrhoidal plexus from underlying internal sphincter muscle and overlying mucosa. This dissection is continued into the rectum, where the resulting broad base of tissue is suture ligated and divided. The mucosal flaps are then allowed to flop back into position. No suture or any intra-anal dressing is used. Parks advocated use of suture for only prolapsed haemorrhoid to reconstitute the mucosal ligament,' but most contemporary descriptions advocate suturing the mucosal flaps loosely together and to the underlying internal sphincter. The same procedure is carried out on the other haemorrhoids. Parks haemorrhoidectomy is done under general or epidural anesthesia. It is safe and associated with low rates of complications and recurrence. It however takes longer time and is more difficult to learn. A recent study by Yang *et al*., 2005, concludes that the modified lift-up sub-mucosal haemorrhoidectomy is an easier operative method compared with the procedure originally developed by Parks.[32]

Whitehead's circumferential haemorrhoidectomy

This procedure, also known as total or circumferential haemorrhoidectomy, was first described by Dr. Walter Whitehead in 1882. After initial success, the procedure was later abandoned due to the high complication rates encountered: haemorrhage, anal stenosis, and ectropion (Whitehead's deformity). The procedure entails circumferential removal of the haemorrhoid, haemorrhoid-bearing of rectal mucosa just proximal to the dentate line. Incisions are made by curved double-operating scissors just proximal to the dentate line and continued along this path around the anal canal in stages. Clamps are used to lift the cut edge of the haemorrhoid rectal bearing mucosa and mucosal prolapse. The haemorrhoidal masses are then suture ligated and excised, followed by closure of the incisions by suture. Here, a retractor is used to stretch the internal sphincter, so that the suture goes through the endoderm to the neo-dentate line. A haemostatic sponge is left in the anal canal. The procedure is reserved only for circumferential haemorrhoids, and it is done under general or epidural anesthesia. Recent works by Maria *et al*. have shown that the Whitehead's haemorrhoidectomy still has a place in selected cases of circumferential haemorrhoids.[33]

MIPH and Stapled haemorrhoidopexy

This procedure is also known as circumferential mucosectomy or 'procedure for prolapse and haemorrhoids' (PPH). It was first described in 1998 by Longo for second to fourth degree haemorrhoids. He suggested that stapled resection of a complete circular strip of mucosa above the dentate line lifts the haemorrhoidal cushions into the anal canal.[34] In PPH, the prolapsed tissue is pulled into a circular stapler that allows the excess tissue to be removed while the remaining haemorrhoidal tissue is stapled. A circular anal dilator is introduced into the anal canal. The prolapsed mucous membrane falls into the lumen after removing the dilator. A purse-string suture anoscope is then introduced through the dilator, to make a submucosal purse-string suture around the entire anal canal circumference. The circular stapler is opened to its maximum position. Its head is introduced and positioned proximal to the purse-string suture, which is then tied with a closing knot. The entire casing of the stapler is then pushed into the anal canal, tightened and fired to staple the prolapse. Firing the stapler releases a double-staggered row of titanium staples through the tissue. A circular knife excises the redundant tissue, thereby removing a circumferential column of mucosa from the upper anal canal. The staple line is then examined with the anoscope for bleeding, which if present may be controlled by placement of absorbable sutures. The staple line should be maintained at a distance of 3-3.5 cm from the anal verge to avoid postoperative rectal stenosis and pain. Patients experience less pain and achieve a quicker return to work compared to conventional procedures; and bleeding is less.

Fig 28: Anal dialator insertion

Fig 29: Anal dialator fixation

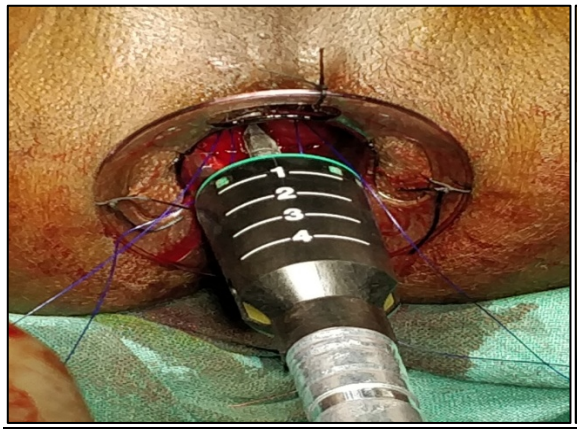


Fig 30: MIPH gun inserted after purse string suturing

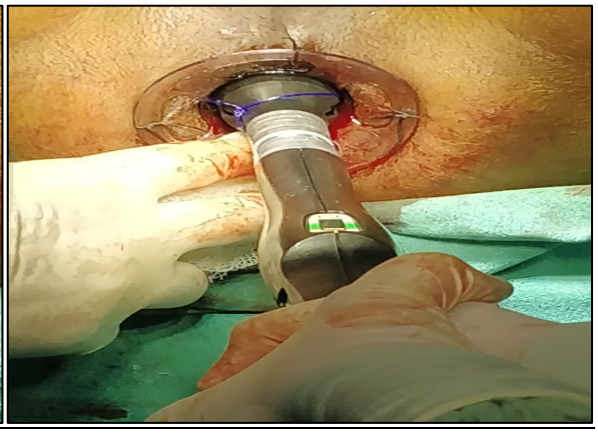


Fig 31: MIPH gun being fired

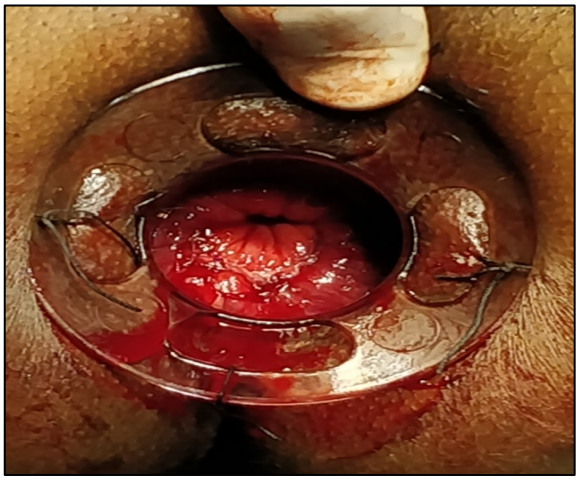


Fig 32: Examination of staple line

Fig 33: MIPH gun with excised tissue

Fig 34: Complete doughnut

Fig 35: Post-op picture

In 1995, Longo described a new and innovative operative technique for haemorrhoid.[35,36] This novel procedure to treat piles is not a haemorrhoidectomy. In this technique neither the anal mucosa and nor the haemorrhoidal tissue is excised. The procedure of MIPH is performed in the patient with piles on distal rectal mucosa and sub-mucosa, proximally to the dentate line.

MIPH haemorrhoidectomy includes excision of a band of excessive or loose prolapse mucosa and sub-mucosa within the rectum, proximally to the haemorrhoidal tissue and fixation of the mucosa by stapled end to end mucosa anastomosis.

These minimally invasive maneuvers occlude the blood supply of the superior haemorrhoidal artery above the haemorrhoidal tissue and thus a pile is cured as well as prolapsed mucosa is retracted up.

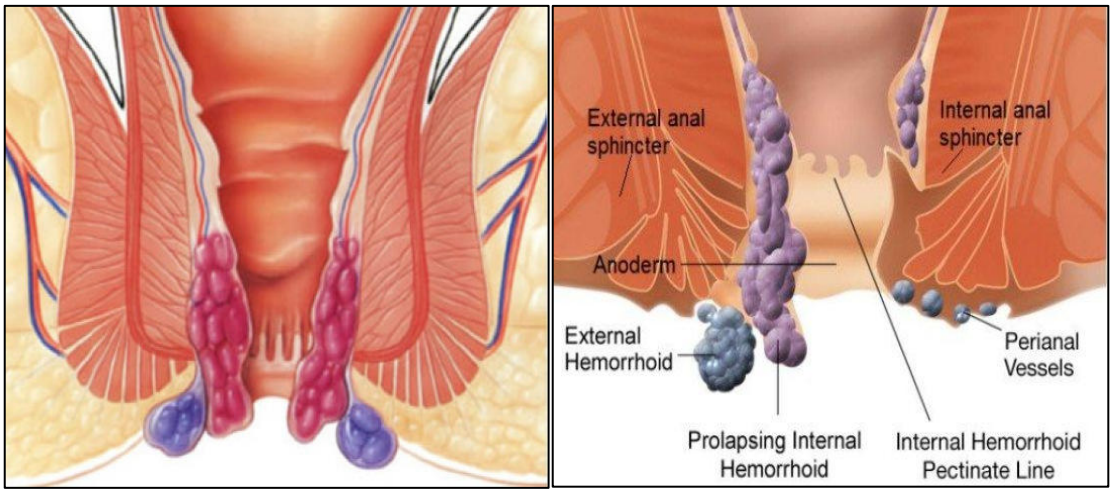


Fig 36 & 37: Types of haemorrhoids

Indications for PPH include patients with grade III haemorrhoids, with uncomplicated grade IV haemorrhoids that are reducible at surgery or after manipulation in the operating room. In the surgery of MIPH haemorrhoidal tissue is not excised during the procedure, and in those who failed other treatment modalities.

Stapled Haemorrhoidopexy procedure uses a special device to remove a ring of tissue from the anal canal. Removal of the tissue above cuts off blood supply to the haemorrhoids,

causing their shrinkage. The tissue ring is then secured with staples. This helps hold the tissue in place.

Stapled haemorrhoidopexy is a significantly less painful operation and offers significant advantages in terms of hospital stay and symptom control in the long term, making for a significantly earlier return to work.

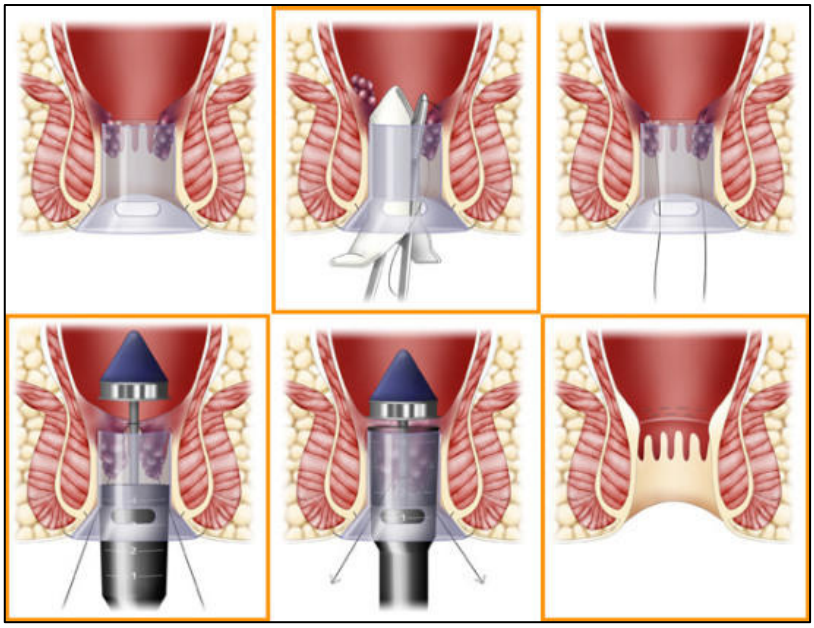


Fig 38: Graphical representation of steps of MIPH

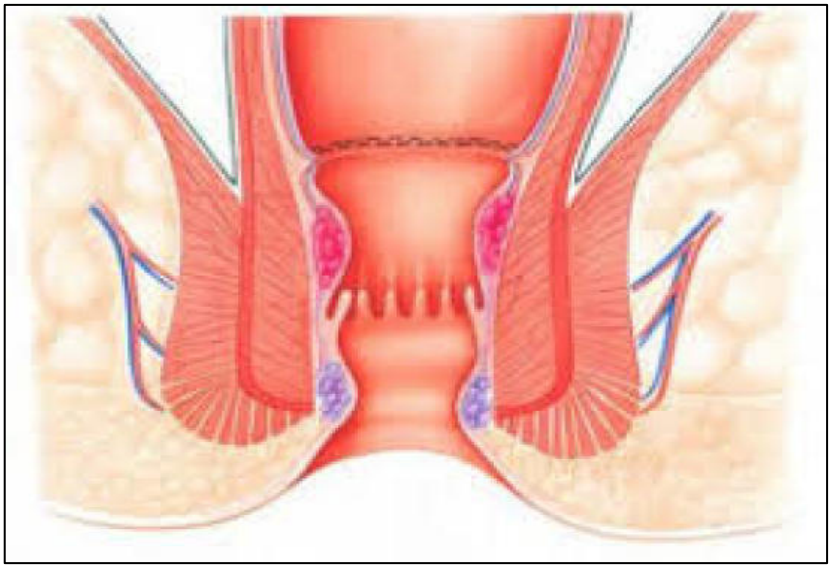


Fig 39: Stapled line of MIPH

Contraindications of Minimally Invasive Procedure for Haemorrhoid are

1. Active sepsis,
2. Anal stenosis,
3. Full-thickness rectal prolapsed and
4. Incarcerated piles

Though, most scholars have proved that MIPH is pretty safe, most common complications are:

1. Recurrence,
2. Chronic pain
3. Higher cost
4. Hemorrhage
5. Instrumental malfunction and failed stapling
6. Incontinence,
7. Septic complications

Doppler-guided haemorrhoidal artery ligation

This is also a new technique first described by the Japanese surgeon Kazumasa Morinaga in 1995,[37] who identified the haemorrhoidal arteries by means of a Doppler (ultrasound) technique. In this process, the operating surgeon uses a specialized proctoscope containing a Doppler probe and a proper working window to place a suture material around the haemorrhoidal mass. All the haemorrhoidal arteries are ligated in this procedure. It is a day care procedure suitable for first-, second- and some selected third-degree haemorrhoids, and the patient goes home after sedation wears off. There is little or no bleeding postoperatively. **George *et al.*** concluded in their study that the procedure is a safe and effective alternative to haemorrhoidectomy.[38] Pure external haemorrhoids would not respond to this procedure.

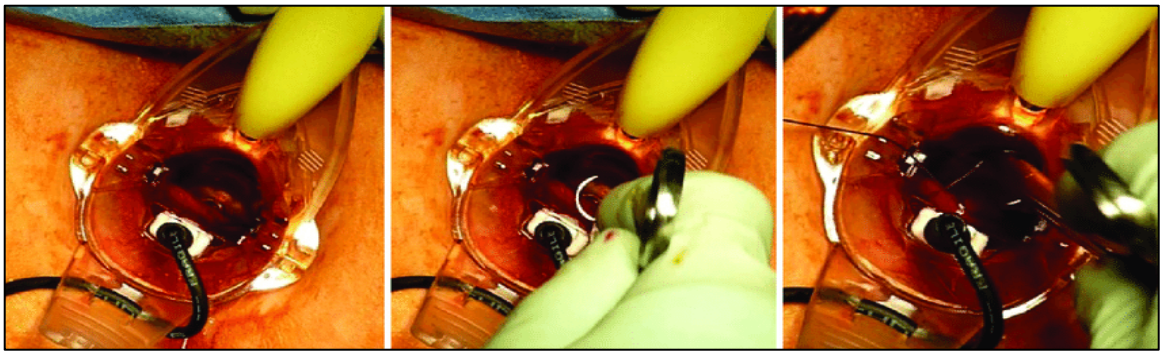


Fig 40: Doppler guided haemorrhoidal artery ligation

Radiofrequency ablation and suture fixation of haemorrhoids (RFA)

It is an innovative procedure designed in 1998 by Gupta for haemorrhoids of grades III and IV.[39] The procedure entails the use of an Ellman dual-frequency, 4-MHz radiofrequency generator for ablation of haemorrhoids. RFA devices work by converting radio waves into thermal energy to ablate desired tissue. The AC used forces rearrangement of the ions within the tissue fluid. This creates ionic agitation and frictional heating, leading to coagulative necrosis of tissue.[40] Thereafter, the haemorrhoids are plicated using strong absorbable sutures. The plication begins from the most distal end of the haemorrhoid at the anal verge and is carried towards the pedicle in a continuous locking manner and knotted at the pedicle, thereby fixing the haemorrhoidal mass. It gives better results in terms of postoperative pain and bleeding than stapled haemorrhoidectomy and Doppler-guided haemorrhoidal artery ligation.[41]

Fig 41: RFA of haemorrhoids

Pile 'suture' method

Also called the pile stitching method, it was first described in 1978 by Faraq for haemorrhoids of grades II and III. The method entails use of three interrupted sutures to secure the haemorrhoids in place without excision.[42]

This procedure is plagued with very high rate of recurrence.

Bipolar diathermy haemorrhoidectomy

This procedure is offered specially to the patients with second, third and fourth degree haemorrhoids. With the aid of a bipolar diathermy set on cutting and coagulation, dissection is carried from a V-shaped incision in the skin around the base of the haemorrhoid unto the pedicle, which is dissected and divided. The diathermy machine is switched to coagulation mode to dissect and divide the pedicle. only during dissection and division of the pedicle. No ligature is used. A randomized trial study conducted and published by Andrews *et al*. showed that diathermy haemorrhoidectomy has no significant advantage over the Milligan-Morgan procedure.[43]

Fig 42: Bipolar haemorrhoidectomy

The harmonic ultrasonic scalpel haemorrhoidectomy

The harmonic scalpel uses ultrasonic energy, which allows for both cutting and coagulation of haemorrhoidal tissue at precise points of application, resulting in minimal lateral

thermal damage.[44] It uses temperatures lower than those of electro-surgery or LASERs. The bleeding vessels are coagulated with the coaptive mode at temperatures between 50°C and 100°C compared to the obliterative coagulation (burning) by electrocautery at 150°C. The oscillating blade having a frequency of 55, 500 cycles/min produces lot of thermal energy which then denaturate the protein in the tissue to form a coagulum that seal off a bleeder. It's usually performed as a day-care procedure for first and second degree haemorrhoids. Although it has been established that the Ligasure haemorrhoidectomy needs lesser operating time with causing less pain to the patient.[45]

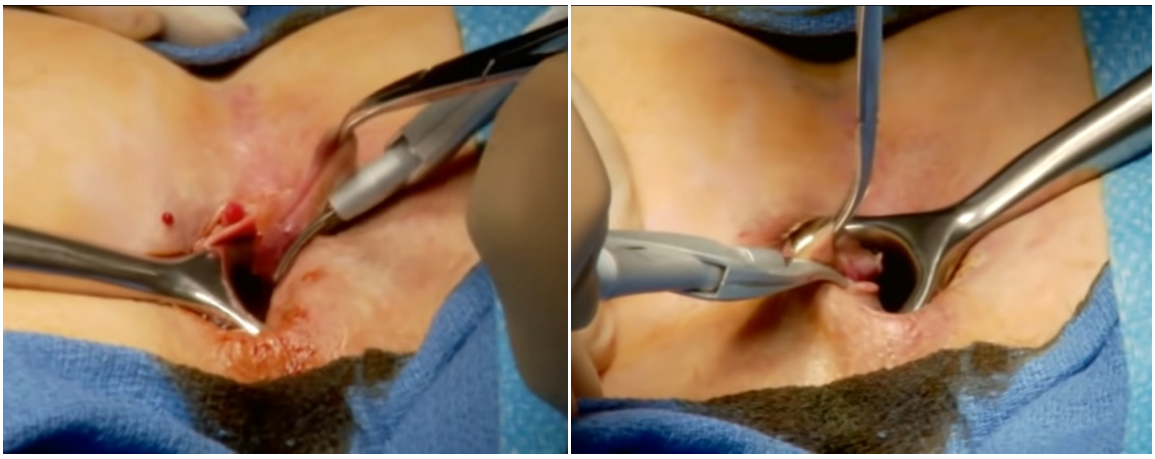


Fig 43: Harmonic scalpel haemorrhoidectomy

Ligasure and Starion haemorrhoidectomy with sub-mucosal dissection

The Ligasure vessel-sealing generator is an isolated-output electrosurgical generator that provides power for vessel sealing and bipolar surgery.[46] It provides precise thermal energy delivery and electrode pressure to vessels to make the lumen wall fused permanently. The Starion thermal welding system is similar to the Ligasure generator but uses the tissue-welding technology to simultaneously fuse vessels and tissue structures closed. The operating temperature is less than 100°C, thereby producing less heat and collateral tissue damage. The operation is done under general or epidural anesthesia. A V-shaped incision at the junction of the haemorrhoid and the peri-anal skin is made by a scalpel, followed by dissection of the haemorrhoidal bundles off the underlying sphincter. The Ligasure or Starion handset is applied to the dissected haemorrhoids and activated to seal mucosal edges and divide the pedicle. A haemostatic sponge is inserted into the anal canal. **Wang *et al.*** demonstrated that the Starion

haemorrhoidectomy has less postoperative pain and par-enteral analgesic requirement than ligasure haemorrhoidectomy, but both have the same advantages of shorter operating time and less blood loss.

Postoperative complications of haemorrhoidectomy

Early — severe postoperative pain lasting 2-3 weeks; wound infection; bleeding; edema of the skin bridges; major short-term incontinence; difficult urination or urinary retention; delayed hemorrhage, usually 7-16 days postoperatively,[47] which is probably due to sloughing of vascular pedicles or infection.[48,49,50]

Late — anal stenosis, formation of skin tags, recurrence and incontinence.[51,52]

Khanna R *et al.* (2010) found that conventional haemorrhoidectomy for grade III and IV haemorrhoids was and is still a tedious procedure associated with significant morbidity and a prolonged convalescence.**[53]** They compared Ligasure™ haemorrhoidectomy with conventional 'closed' Ferguson's haemorrhoidectomy for the treatment of grade III and IV haemorrhoids. Forty-eight consecutive patients of grade III and IV haemorrhoids were randomized to either the Ligasure™ haemorrhoidectomy (28 patients) or Ferguson's haemorrhoidectomy (20 patients). The haemorrhoidal pedicle was coagulated with Ligasure™ in the Ligasure™ group and transfixed with 2-0 RB chromic catgut in Ferguson's method. In comparison with Ferguson's method, Ligasure™ haemorrhoidectomy had a shorter operating time (29 vs. 12.5 min), less blood loss (22 vs. 11.5 ml), less post-operative pain as measured on VAS scale and less postoperative complications including haemorrhage (10% vs. 3.5%), urinary retention (10% vs. 3.5%) and wound breakdown (20% vs. 14%). The sub-mucosal dissection technique with Ligasure™ coagulation of the haemorrhoidal pedicle is safe and effective. The blood vessels and tissue are reduced to a wafer thin seal with good haemostasis. Suturing is not required as the mucosal tissue over the pedicle is sealed off with the electricity. There is minimal lateral spread of either thermal or electrical energy. The external components of the haemorrhoids can also be treated at the same time. Because of its ease of use and less postoperative pain and complications, Ligasure™ haemorrhoidectomy can be performed as a day-care procedure.

Agbo SP *et al.* (2011) wrote in their paper that haemorrhoids are common human afflictions known since the dawn of the history.**[54]** Surgical management of this condition has

made tremendous progress from complex ligation and excision procedures in the past to simpler techniques that allow the patient to return to normal life within a short period. Newer techniques try to improve on the post-operative complications of older ones. The surgical options for the management of haemorrhoids today are many. Capturing all in a single article may be difficult if not impossible. The aim of this study therefore is to present in a concise form some of the common surgical options in current literature, highlighting some important post-operative complications. Current literature is searched using MEDLINE, EMBASE and the Cochrane library. The conclusion is that even though there are many surgical options in the management of haemorrhoids today, most employ the ligature and excision technique with newer ones having reduced post operative pain and bleeding.

Yeo D *et al.* (2014) found that while debate continues as to which is the best surgical method for the treatment of haemorrhoids, none of the currently available surgical methods approach had claimed the first choice which should be ideally most effective while being safe and painless.[55]In reality, the less painful the procedure, the more likely it is to be associated with recurrence post-op. Where haemorrhoids surgery is concerned, there isn't a "one size fits all" option. Most of the randomized controlled trials performed to date include haemorrhoids of various grades and with a focus on only comparing surgical methods while failing to stratify the outcomes according to the grade of haemorrhoid. They believe that surgery needs to be tailored not only to the grade of the haemorrhoids, but also to the size, circumferential nature of the disease, and prevailing symptomatology.

Agrawal S *et al.* (2016) pointed out that haemorrhoids are fibro-vascular cushions containing arterio-venous communications that are located in the sub-epithelial space of anal canal and are a normal part of human anatomy.[56]Haemorrhoids are a very common anorectal condition defined as the symptomatic enlargement and distal displacement of the normal anal cushions. They affect millions of people around the world, and represent a major medical and socioeconomic problem. Multiple factors have been claimed to be the etiologies of haemorrhoidal development, including constipation and prolonged straining. The abnormal dilatation and distortion of the vascular channel, together with destructive changes in the supporting connective tissue within the anal cushion, is a paramount finding of haemorrhoidal disease, an inflammatory reaction and vascular hyperplasia may be evident in haemorrhoids.

Kunitake H *et al.* (2016) observed that anorectal surgery was well tolerated.[57] Rates of minor complications are relatively high, but major postoperative complications are uncommon. Prompt identification of postoperative complications is necessary to avoid significant patient morbidity. The most common acute complications include bleeding, infection, and urinary retention. Pelvic sepsis, while may result in dramatic morbidity and even mortality, is relatively rare. The most feared long-term complications include fecal incontinence, anal stenosis and chronic pelvic pain.

Sharma B *et al.* (2017) observed that haemorrhoids and piles are used interchangeably very often but originally the words have entirely different meanings.[58] Surgical treatments of haemorrhoids have been suggested for third and fourth grade haemorrhoidal disease and include removal of haemorrhoidal tissue. Stapled haemorrhoidectomy [minimally invasive procedure for haemorrhoid (MIPH)] introduction received much enthusiasm as it offers patients a significantly improved postoperative comfort level. The aim of this study is to make comparative assessment of following procedures for haemorrhoids: Stapled haemorrhoidectomy, open haemorrhoidectomy, closed haemorrhoidectomy, in terms of operative time, hospital stay, postoperative complications, and cost-effectiveness.

Thirumalagiri VR *et al.* (2017) focused on a study to compare open haemorrhoidectomy with minimally invasive procedure for haemorrhoids with special reference to operative time, post-operative pain, post-operative bleeding, duration of hospital stay and recurrence.[59] This is a prospective study comparing the two types of surgical procedures for haemorrhoids. Milligan-Morgan haemorrhoidectomy, Minimally Invasive Procedure for Haemorrhoids in 45 patients admitted and underwent surgery in with complaints of bleeding per rectum, pain during defecation, mass per rectum, discharge and irritation. Haemorrhoids were common in the age group of 40years and above with mean age of presentation 45.8±13.8 years. There is less number of patients above 60 years. Male (69%) patients are more in number than female (31%) patients. Bleeding, pain and mass per rectum were the most common complaints as majority of patients operated are grade III and grade IV. In this study, 51% of the patients are with grade III and rest is from grade II &IV. The operating time in present study for stapler haemorrhoidectomy was 28.76±3.5minutes and for open haemorrhoidectomy 36.2±6.5minutes. Stapled haemorrhoidectomy was significantly faster than open haemorrhoidectomy (21minutes versus 31

minutes). Mean score of pain for MIPH group is 3.5±2 and for Milligan-Morgan group is 5.7±2.2. Pain usually appeared after weaning off of the spinal anaesthesia for which NSAIDs or tramadol was used. Bleeding in the post-operative period was in 9.5% of the cases of stapler haemorrhoidectomy where as bleeding was seen in 20.8% of the cases of open haemorrhoidectomy which ranged from dressing soakage to about few drops of blood during defecation. Urinary retention in their study is 9.5% in MIPH group and 12.5% in Milligan-Morgan group which is not differed significantly, with p value > 0.005. Mean post-operative hospital stay in MIPH group is 1.1±0.35 days and 2.3±1.2 days in Milligan-Morgan group, which is statistically significant with p value < 0.005. Patients had been followed for 6months to 24 months, detecting 1 case of recurrence in MIPH and 1 case of recurrence in Milligan-Morgan with 4.76% vs. 4.16% percentage respectively with p value of >0.005. 2 patients of anal stenosis have been identified with 8.5% and no cases in stapler haemorrhoidopexy with p value >0.005. Stapler haemorrhoidopexy is thus a viable alternative to open haemorrhoidectomy in its indicated group of patients who can afford the stapler with distinct advantages.

Patel UP *et al.* (2017) showed that MIPH (Minimal invasive procedure for prolapsed piles) was found to be adventitious than conventional haemorrhoidectomy and performed at day stay unit.[60] Conventional haemorrhoidectomy patients are usually admitted and operated under saddle anaesthesia. Choice of anaesthesia for MIPH at day care unit needs to consider more safe technique which helps early recovery and discharge with minimum complications. Present study was performed with an aim to compare saddle anaesthesia and general anaesthesia utilizing i-gel in patients with minimal invasive procedure for haemorrhoids. A total of 60 patients of ASA Grade 1 & 2, between age of 18 and 60yrs undergoing MIPH as day stay surgery were randomly allocated by a computer generated list in to two groups. Group-S received saddle anaesthesia and Group G received general anaesthesia with i-gel. Patients were observed for per operative events and post-operative pain, nausea, vomiting, urinary retention and postural hypotension. Any adverse events were recorded. Time and Number of patients that could be successfully discharged in both the group were recorded. Group-S had less pain and needed less analgesic as compared to Group-G in immediate post-operative period and had less nausea and vomiting but urinary retention and postural hypotension was more common in them which delayed their discharge and needed unplanned admission. Aim of surgery to treat patient at day stay unit could be achieved more by selecting general anaesthesia over saddle anaesthesia with less chances of

urinary retention. Saddle anaesthesia is associated with increased risk of unplanned admission after haemorrhoidal day surgery.

Vinayaka NS *et al.* (2018) claimed that the aim of the study was to compare the results of Ligasure haemorrhoidectomy and conventional haemorrhoidectomy in terms of operating time and blood loss, post-operative pain, post-operative complications, hospital stay and time to return to work.[61] The study population consisted of 60 patients who were admitted with Grade III or Grade IV haemorrhoids. Patients were submitted to one of the surgical procedures mentioned above after randomization. The time for each surgical procedure, the per operative bleeding and post-operative pain using visual analogue scale , time for defecation after operation and pain and bleeding associated with it were assessed. Early post-operative complications, patients' length of hospital stay and time to return to work were compared. A follow up examination was conducted for minimum period of 6 months. The duration of surgery (25.50±9.50 minute vs. 41.67±4.97 minutes, P value <0.001), per-operative bleeding (17.50± 6.66 ml vs. 27.17±2.52 ml, P value: <0.001), duration of stay in hospital (6.20±1.37 days versus 10.40±1.52 days, P value: <0.001) was statistically significantly less with Ligasure haemorrhoidectomy when compared to conventional haemorrhoidectomy. Also Post-operative pain and time taken to return to normal activity was almost similar in both methods. One patient in Ligasure haemorrhoidectomy developed anal stenosis and needed operative intervention. Ligasure haemorrhoidectomy is a sutureless, safe and effective procedure for haemorrhoids when compared with conventional variety and is a simpler technique and has the ability to make haemorrhoidectomy a day care procedure.

Alhomoud H *et al.* (2018) stated that haemorrhoidal disease is one of the most frequently encountered anorectal conditions in the clinical practice.[62] A variety of instruments including circular staplers, harmonic scalpel, laser, and bipolar electro-thermal devices are currently used when performing haemorrhoidectomy grades III and IV. This study compares outcomes between haemorrhoidectomy performed with harmonic scalpel and conventional methods. A prospective randomized control study included consecutive 50 patients undergoing haemorrhoidectomy between January 2017 and October 2017. Patients were randomly enrolled in two different groups. Group I consisted of 25 patients who underwent haemorrhoidectomy using an ultrasonic scalpel device (harmonic) and group II with 25 patients who had conventional

haemorrhoidectomy. The patients' demographics data and clinical characteristics were similar in both groups. The harmonic group had a shorter operation time, less postoperative pain, less postoperative bleeding, and shorter hospital stay. Harmonic scalpel haemorrhoidectomy appears to be a better procedure for symptomatic grades III and IV haemorrhoids with ease of operating due to less bleeding, less postoperative pain, and patient acceptance. Long-term follow-up with larger scale studies is required.

Gupta S *et al.* (2019) exclaimed that haemorrhoid was and would be one of the commonest anorectal disorder which usually requiring surgical intervention.[63]Conventional haemorrhoidectomy had been practiced for long time but in 1993 Longo introduced a newer minimally invasive procedure for haemorrhoids. In this study they have compared the post-operative results of MIPH with conventional open haemorrhoidectomy. To analyze and compare various Pre and post-operative factors such as duration of surgery, post-operative pain and analgesia, duration of hospital stay, post- operative complications, recurrence and early return to work in the patients suffering from Grade III and IV haemorrhoids patients undergoing open Milligan-Morgan's haemorrhoidectomy and Minimal Invasive Procedure for Haemorrhoids(MIPH). In this prospective study a total of sixty patients underwent surgery for grade III and IV haemorrhoids at Santosh Medical College and Hospital, Ghaziabad from April 2017 to October 2018. Thirty patients in group A underwent Milligan Morgan technique of open haemorrhoidectomy and thirty patients in group Bunderwent Longo's technique of MIPH (Minimal Invasive Procedure for Haemorrhoids). The average duration of surgery was significantly less in MIPH group as compared to open haemorrhoidectomy group. Only 6.6% of MIPH developed early post-operative complications whereas at least 25% of open haemorrhoidectomy developed early complications such as pain, bleeding per rectum and wound infection. Early return to work was significantly better in MIPH group. MIPH is safe with a low recurrence rate and complications. It is a novel technique and has emerged as an alternative to open haemorrhoidectomy. Only limitation is the cost of the MIPH stapler device.

Sarangi C *et al.* (2019)reveals that haemorrhoids are one of the most common benign anorectal problems worldwide.[64] The treatment of third and fourth degree haemorrhoids is surgical. Surgical haemorrhoidectomy and stapled haemorrhoidopexy are the currently available surgical interventions in the management of haemorrhoids. The aim of the study is to evaluate

the effectiveness of open haemorrhoidectomy with minimal invasive procedure for haemorrhoids (MIPH). 80 cases were selected for these studies which were divided into two groups of 40 each. Open surgery (Milligan-Morgan haemorrhoidectomy) was done in one group and MIPH in the other group .The follow up period was one year. The duration of post operative pain, complications, level of satisfaction were documented. The relative merits and demerits of the procedures were assessed and the results documented. MIPH was found out to be a safe and effective procedure in patients presenting with haemorrhoids .Duration of hospital stay is less and hence return to work is earlier. MIPH can be considered as a procedure of choice in patients presenting with grade II, grade III and grade IV haemorrhoids.

Rajkumar JS *et al.* (2019) find that minimally invasive procedure for haemorrhoids is one of the commonest new wave operations done for prolapsed haemorrhoids.[65] The diameter of the stapled tissue is critical in this operation, and an increase in the same could include more tissue in the anvil, with disastrous results. This is a case report of a post minimally invasive procedure for haemorrhoids bleed, which was refractory to two local oversewing attempts. When the bleeding was massive, an angiogram was obtained. This revealed a pseudo-aneurysm of the left superior haemorrhoidal artery, which was embolized, stopping the bleed. The stapler dimensions were studied and the possible cause of the event was arrived at. The specific stapler used had a diameter of 2 mm more than the regular Medtronic and Ethicon staplers, possibly including more of the rectal wall, and the superior haemorrhoidal artery as well. This case report documents a rare and potentially fatal complication of a simple procedure.

Kaushal A *et al.* (2020) observe that stapler haemorrhoidopexy (SH) has evolved over time as a procedure of choice over conventional surgery due to less postoperative pain.[66] Laser haemorrhoidoplasty (LH) is a novel procedure aimed at shrinking the terminal branches of haemorrhoidal arteries with fewer complications. The present study was aimed to compare these procedures (SH and LH). The study model was prospective comparative type. Patients operated for haemorrhoids at the department of general, MI & bariatric surgery, Artemis Hospitals, Gurgaon from April 2018 to March 2019. 50 patients with grade II and III haemorrhoids were allocated to two groups: Stapler haemorrhoidopexy (SH) and Laser haemorrhoidoplasty (LH) with 25 patients in each group. Results were compared and patients were followed up for minimum period of 3 months. The mean operative time was 24.6 min (LH) and 28.6 min (SH) (P

=.122). The average blood loss was 8.32 ml (LH) and 11.64 ml (SH) (P <.05). The mean hospital stay 21.44 hours (LH) and 32.64 hours (SH) (P <.05). Mean postoperative pain score (VAS) at 12 hours was 2.64 (LH) and 4.76 (SH) (P <.05), at 24 hours was 1.88 (LH) and 3.6 (SH) (P <.05), at 1 week was 0.36 (LH) and 0.88 (SH) (P =.054) and at 3 months 0.04 (LH) and 0.12 (SH) (P =.53). One patient in LH (4%) had postoperative bleeding on 4th postoperative day. In SH group, 2 (8%) had severe postoperative pain with VAS > 8, requiring longer hospital stay, 2 (8%) had bleeding on the same day, 1 (4%) had bleeding on follow up and 1 (4%) had recurrence. In terms of early postoperative pain and complications, LH offers better results as compared to SH. It was associated with a shorter hospital stay and early return to work. No significant complications were noted in LH compared to SH. LH is an extremely viable alternative to the popular SH for grade II and III haemorrhoids.

Piccinini P *et al.* (2020) find that management of circumferential haemorrhoidal prolapse represents a challenge for surgeons, and there are currently many alternatives to conventional procedures.[67] However, none of these techniques consider treatment of external disease when present. The objective of this publication is to present a new procedure to treat patients with mixed haemorrhoidal prolapse. A prospective database was performed including all patients operated for circumferential haemorrhoidal prolapse combined with an external component, using stapled haemorrhoidopexy to treat prolapse followed by laser ablation of external haemorrhoids. Information about patient co-morbidities, surgical procedure, and postoperative aspects was collected. Finally, two validated questionnaires were used to measure changes in quality of life and symptoms related to haemorrhoidal disease. Twenty-five patients were recruited, and 72% were females. The median operative time was 58.56 min (standard deviation [SD]: 10.43 min), and the median number of external plexus treated with laser was 2.17 (SD: 1.01). The overall complication rate was 4%. Oral rescue medication was taken for a median of 4.68 days (SD: 2.43 days), and the time to return to normal activities was 2.22 weeks (SD: 1.28 weeks). The mean pain scores immediately after surgery, 1 week, and 1 month later were 5.25 (SD: 2.25), 4.08 (2.48), and 1.28 (2.49), respectively. Changes in quality of life scores and disease symptoms were significant. Stapled haemorrhoidopexy combined with laser coagulation of external haemorrhoids may represent a new valuable alternative for patients with severe mixed haemorrhoidal disease. Further studies should be conducted to validate these results. Stapled haemorrhoidopexy combined with laser coagulation of external haemorrhoids seems a

very good alternative for patients with mixed haemorrhoidal prolapse, particularly to avoid postoperative pain and complications related to conventional surgery. Moreover, it comes as a solution to incomplete treatment by alternative procedures which address only internal component.

Malyadri N *et al.* (2021) found that stapled haemorrhoidopexy had been considered as a novel technique in the surgical treatment of prolapsed haemorrhoids.[68] Although it involves substantial added cost, it resulted in shorter period of convalescence in comparison with open haemorrhoidectomy. To investigate and compare the outcome and post-operative complications in patients with grade III and IV haemorrhoids who underwent haemorrhoidectomy with either stapler haemorrhoidectomy or Milligan Morgan haemorrhoidectomy. A total of 80 patients between the age group 28 to 40 years who were diagnosed with grade III and IV haemorrhoids were divided into two groups equally. Group 1 contains 40 Patients undergoing stapler haemorrhoidopexy and Group 2 contains 40 Patients undergoing open Milligan-Morgan haemorrhoidectomy. Post-operatively patients of both the groups were assessed for bleeding, pain against pre-operative symptom profile, development of recurrence and long-term complications. Comparative analysis between the two groups were done based on student's T test using SPSS software version. The level of significance was set at 5% ($p < 0.05$). Stapler haemorrhoidopexy technique was quicker to perform in comparison with Open haemorrhoidectomy (p value < 0.001). Hospitalization and duration of resumption to daily activity was less in Stapler haemorrhoidopexy group as compared to open Milligan-Morgan haemorrhoidectomy group (p value < 0.001). Both methods were effective in the treatment of haemorrhoidectomy, however the advantages of stapler haemorrhoidopexy in terms of lesser operative time and intra and post-operative bleeding and lower incidence of various post-operative complications was observed.

Sadeghi PM *et al.* (2021) concluded that conventional haemorrhoidectomy is still used for patients but a variety of less invasive treatments are also developed.[**69**] Stapled haemorrhoidopexy is known as a far more beneficial technique. Here they aimed to evaluate and compare the results of stapled haemorrhoidopexy with conventional methods in patients who require haemorrhoidectomy. This study was performed on 120 patients with stage 3 or 4 haemorrhoids. Mean resting pressure (MRP) and mean squeezing pressure (MSP) were measured

before surgeries. Patients were then randomized into 2 groups of 60 patients. Group 1 underwent stapled haemorrhoidopexy and group 2 underwent conventional haemorrhoidectomy. The pain of patients was also determined using the visual analogue scale (VAS) for each patient 1, 2 and 3 days after the surgeries. Patients were then followed for 1 month after surgeries for evaluating the surgical outcomes, MRP and MSP. In terms of recurrence, they underwent clinical and anoscopic re-examination at least once in the next 6 months and 12 months after interventions. They showed that both MRP and MSP did not change significantly in both groups after interventions ($P>0.05$). They also observed a significant decline in the pain of both groups ($P<0.001$) and also a significantly lower pain in group 1 ($P<0.05$).Their data showed that patients in group 1 required less analgesic after procedures ($P=0.001$). Evaluation of recurrence rate 6 and 12 months after interventions showed that patients who underwent stapled haemorrhoidopexy had a significant higher recurrence rate within 12 months compared to the other group ($P=0.003$). Stapled haemorrhoidopexy is a safe and effective method that is associated with lower pain, hospitalization duration and no significant complications within 1 year follow-up. But on the other hand, this surgical method was associated with a higher recurrence rate.

Zhang C *et al*. (2022)conducted study to investigate the clinical effect and outcome of traditional haemorrhoidectomy and procedures for prolapse and haemorrhoid (PPH) for the treatment of grades III and IV haemorrhoids.[70] They retrospectively reviewed 1003 grades III and IV haemorrhoid patients who presented to their hospital. A total of 585 patients underwent PPH, and 418 patients underwent haemorrhoidectomy. The outcomes were 1-year recurrence, postoperative complications, surgery-related complications, and indicators. No significant difference between the 2 treatment groups regarding patient demographics. All patients underwent more than 12months of post-operative follow-up. No significant difference between the 2 treatment groups in 1-year recurrence. PPH can markedly improve anal pain, postoperative bleeding, difficult urination, and postoperative resting anal pressure. The operative blood loss, operative time, wound healing time, and wound infection rates were decreased significantly in the PPH group compared with the traditional haemorrhoidectomy group. Their data suggest that PPH is useful and safe for grades III and IV haemorrhoids. It can reduce postoperative and surgery-related complications. However, this was a single-hospital retrospective study. Therefore, well-designed, multicenter, randomized controlled trials are needed to evaluate the value of PPH for grades III and IV haemorrhoids.

MATERIALS AND METHODS

MATERIAL AND METHODS

Place of study- Department of General Surgery, Santosh Medical College & Hospital, Ghaziabad, Uttar Pradesh.

Duration of study- July 2021 to June 2022

Study design - Comparative interventional study

Sample size -

$$n = 2(Z1-\alpha/2+Z1-\beta)\ 2\ J2\ /\ (\mu1-\mu2)2$$

Where, Zα = 1.96 at 5% level of significance

Zβ = 1.28 at 90% power of test

μ1 = Mean of reference group

μ2 = Mean of test Group

J = Pooled Standard Deviation

The sample size is, n = 68 Patients

Group A (Conventional haemorrhoidectomy) – 34

Group B (MIPH)– 34

Reference article -The study conducted by **Sheikh P *et al.*** [71]

Inclusion Criteria

A) Patients willing to participate in study.

B) Patients suffering from haemorrhoids requiring surgery and undergoing conventional haemorrhoidectomy or MIPH.

C) Patients of age group 18-65 years.

Exclusion Criteria

1. Patients who refused to be a part of the study.
2. Patients younger than 18 or older than 65 years.
3. Immuno-compromised patients.
4. Patients with suspected and/or proven malignancy.
5. Patients with history of previous ano-rectal surgery.
6. Patients unfit for surgery.

Methodology

- This is an interventional prospective study carried out at general surgery department Santosh Medical College & Hospital from July 2021 to June 2022. This study includes 68 patients of haemorrhoids requiring surgical management and willing to undergo conventional haemorrhoidectomy or MIPH (Minimal Invasive Procedure for Haemorrhoids). All these patients were categorized into 2 equal size groups of 34 patients each depending upon their personal preferences for surgery.
- All the patients were examined thoroughly after taking proper history. Diagnosis of haemorrhoids was achieved on the basis history and examination particularly DRE and proctoscopy.
- Group A consisting of 34 patients underwent Open Milligan-Morgan (open) haemorrhoidectomy or Ferguson's (closed)haemorrhoidectomy and group B also comprising of 34 patients were taken up for MIPH.
- Patients in both the groups were explained about both the techniques and their expected costs and formal consents were taken as per their choice.
- Patients underwent necessary pre operative routine investigations followed by formal PAC. The patients were operated after obtaining necessary PAC clearance.
- Patients were resuscitated before if required, few of them needing PRBC and other blood products transfusions.

- Colonoscopy done only in few selected cases where it was indicated. The patients who had the diagnosis of haemorrhoids on colonoscopy, only those patients were included in this study.
- Patients particularly the elder ones with history of significant unintentional weight loss, repeated altered bowel habits, malaena, haematemesis, mass per abdomen, long history of alcohol abuses and with other clinical features which raised suspicion for malignancy or any patient with CECT or colonoscopic biopsy proven malignancy, were excluded out of this study.
- Patients with established HIV or Hepatitis virus infection or CLD as well as any patients with history of previous ano-rectal surgery were also excluded.
- All the surgeries were performed in lithotomy position under spinal or saddle anaesthesia.
- The surgeries in the both groups were performed by experienced ano-rectal surgeons.
- Amongst the all available procedures of MIPH, we have opted for stapled haemorrhoidopexy with a PPH (Procedure for Prolapse and Haemorrhoids) gun kit from renowned commercial companies like Ethicon, MIRUS or Axon.
- All patients were evaluated for various intra op factors and post op outcomes and all data preserved.
- The operation duration was calculated from parts painting to post operative dressings.
- The intra-operative bleeding was measured counting the gauze pieces used during the surgery. The number fully blood soaked standard gauze pieces of 5cm*5cm size were counted after each surgery. Different sizes of mops or pads were avoided as far as possible. Rarely, when a standard 30cm*30cm surgical mop is used specially during profuse bleeding, a fully soaked mop was counted equal to 5 fully soaked gauze pieces as per the most excepted literatures (a standard 5*5 gauze would soak approx 12-15 ml blood when fully soaked) and tabulated accordingly to maintain uniformity in the study.
- In group B, any specific malfunction related to the MIPH gun was noted. Any time, a MIPH gun was broken or damaged; it would be replaced if it needed. In cases of incomplete stapling of tissue after usage of MIPH gun, the edges would be underrun manually after adequate homeostasis with 3-0 polypropylene suture RB (prolene).
- Anal packing was done in all the cases.

- The anal packings were routinely removed after 24 hours. If bleeding occurs per rectum after removal of the pack, the event was noted and managed by repacking with or without topical adrenaline (1:100000) or haemocoalgulase solutions or by prescribing injectable tranexamic acid as needed.
- Pain was measured as continuous variable using visual analogue scale (VAS, 0-10 scale) on POD 1 and 7. VAS scoring was done by the patients themselves.

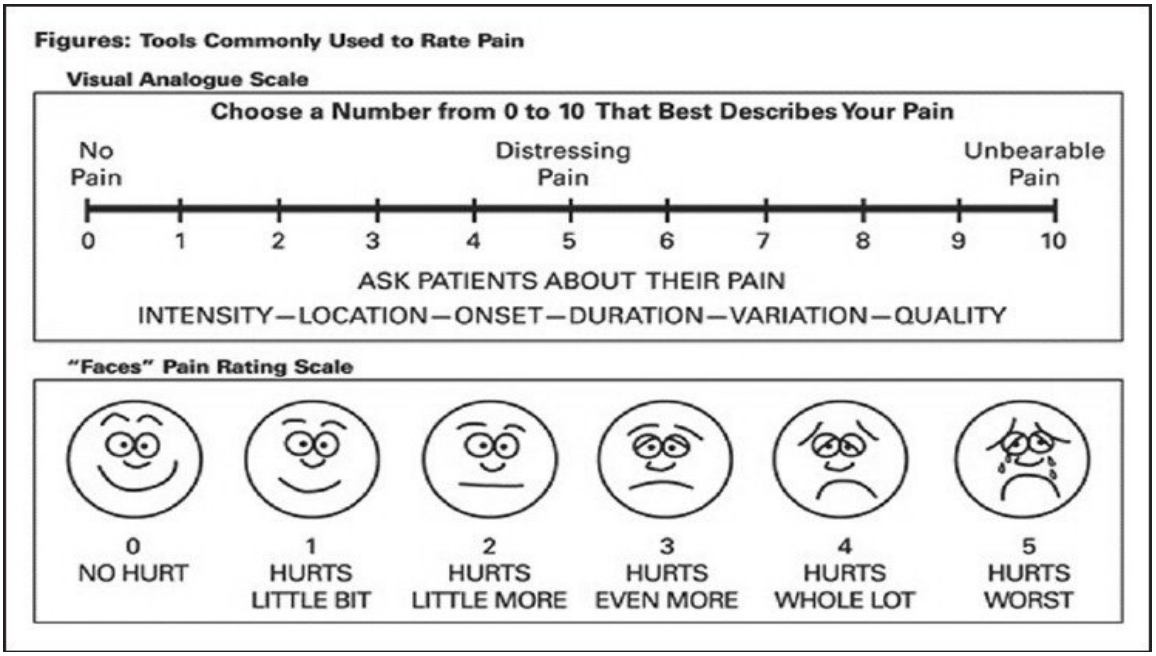

Figures: Tools Commonly Used to Rate Pain
Visual Analogue Scale
Choose a Number from 0 to 10 That Best Describes Your Pain
No Pain
Distressing Pain
Unbearable Pain
0 1 2 3 4 5 6 7 8 9 10
ASK PATIENTS ABOUT THEIR PAIN
INTENSITY—LOCATION—ONSET—DURATION—VARIATION—QUALITY
"Faces" Pain Rating Scale
0 NO HURT
1 HURTS LITTLE BIT
2 HURTS LITTLE MORE
3 HURTS EVEN MORE
4 HURTS WHOLE LOT
5 HURTS WORST

Fig 42: VAS scale

- Injectable diclofenac 75 mg aqueous solution was used in routine 8 hourly as painkillers in post operative period for shortest possible time intra-vascularly or intra-mascularly. The required duration of the injectable painkillers were also documented in each case.
- The hospital stay requiring in every patient was taken into consideration.
- The patients were followed up at least on POD 7 and 30 and any other times as deemed necessary.
- On follow up, the patients were evaluated for any complications like persisting pain, bleeding, incontinence, recurrence, sepsis and stenosis etc and treated accordingly.
- All the data accumulated were analyzed and compared for both the groups.

Statistical Analysis

Sample size has been calculated with help of Epi Info (TM) 3.5.3. EPI INFO which is a trademark of the Centres for Disease Control and Prevention (CDC).For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. One-way analysis of variance (one-way ANOVA) was a technique used to compare means of three or more samples for numerical data (using the F distribution). A chi-squared test ($\chi 2$ test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, which ever seemed appropriate.

The Mann–Whitney U test is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample is less than or greater than a randomly selected value from a second sample. This test can be used to determine whether two independent samples were selected from populations having the same distribution; a similar nonparametric test used on dependent samples is the Wilcoxon signed-rank test.

Z-test (Standard Normal Deviate) was used to test the significant difference of proportions. Correlation was calculated by Pearson correlation analysis. The Pearson product-moment correlation coefficient was a measure of the linear dependence between two variables X and Y. Multivariate analysis was performed by logistic regression method for calculation of risk factors. The Kaplan–Meier estimator (Kaplan-Meier survival analysis) was a non-parametric statistic used to estimate the survival function from time data.

Explicit expressions that can be used to carry out various *t*-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a *t*-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are

given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a *t* value is determined, a *p*-value can be found using a table of values from Student's t-distribution. If the calculated *p*-value is found out to be below the threshold, calculated as per statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favor of the alternative hypothesis.

P-value ≤ 0.05 was considered for statistically significant.

RESULTS AND ANALYSIS

RESULT & ANALYSIS

Table 1: Distribution of patients according to age groups

Age Groups	Number of patients	Percentage
18-20	1	1.47%
20-29	4	5.88%
30-39	18	26.47%
40-49	15	22.06%
50-59	13	19.12%
60-65	17	25.00%
Grand Total	**68**	**100.00%**

In our study, it was found that 1 patient was 18-20 years (1.47%), 4 were in 20-29 years group (5.88%), 18 patients belonged from 30-39 years group (26.47%), 15 patients were of age 40-49 years (22.06%), 13 patient were having age between 50-59 years (19.12%) and the rest 17 patients fell in 60-65 age group (25%).

The maximum patients were found out of age group 30-39 years in our study.

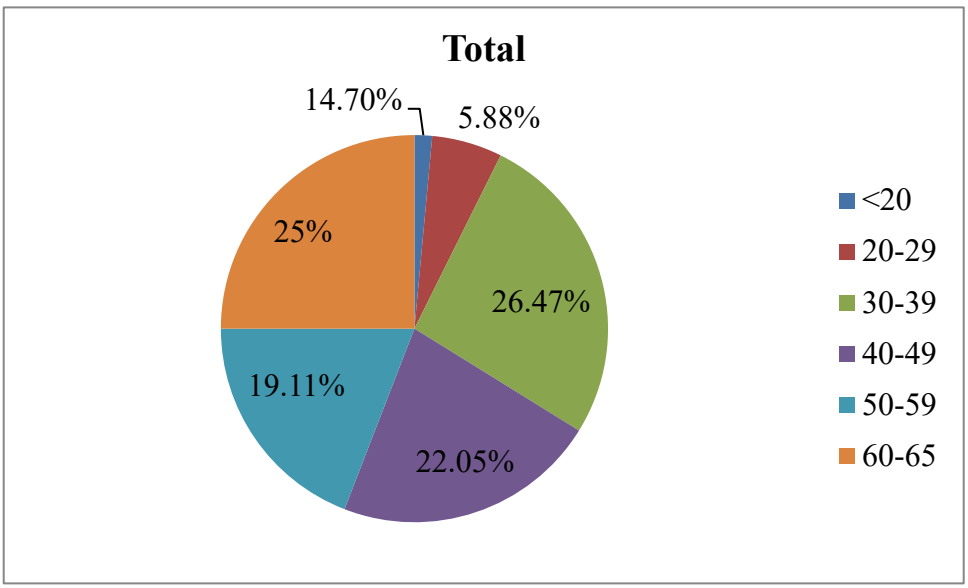


Table 2: Number of patients according to age groups

Age Groups	Group A Conventional Haemorrhoidectomy	Group B MIPH	Grand Total
<20	0	1	1
20-29	3	1	4
30-39	10	8	18
40-49	7	8	15
50-59	8	5	13
60-65	6	11	17
Grand Total	**34**	**34**	**68**

In Group A, no patients were below 20 years, 3 patients were of 20-29 years, 10 from 30-39 years group, 7 fell in 40-49 years group, 8 patients from 50-59 years group and lastly, 6 came from 60-65 years group.

In group B, 1 patient was below 20 years, 1 patient was from 20-29 years group, 8 patients each from 30-39 and 40-49 years group, 5 came from 50-59 years group and rest 11 were of age between 60-65 years.

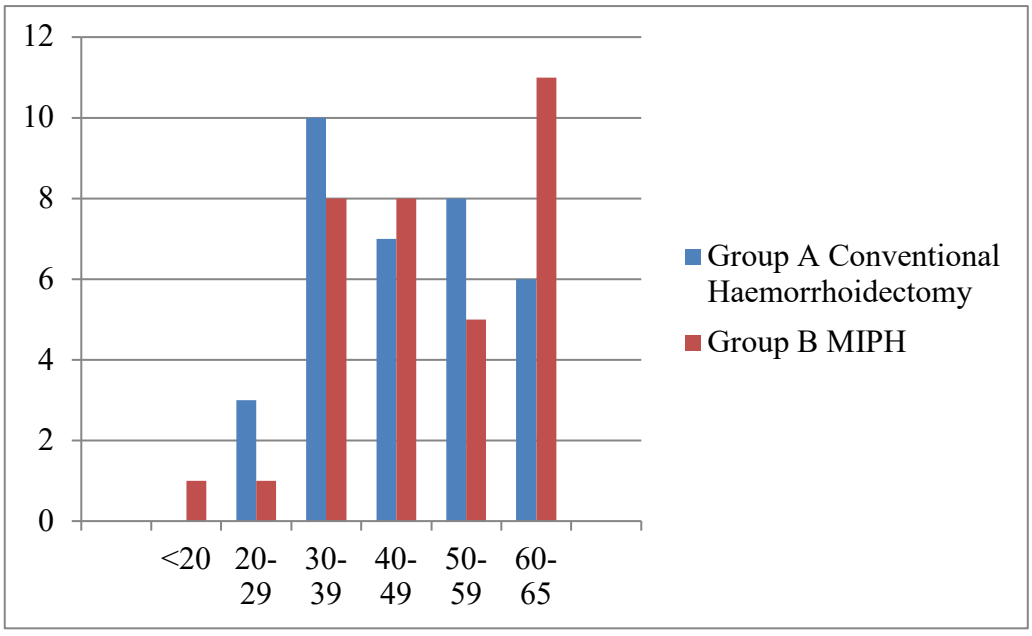


Table 3: Association between Gender and Procedure

Gender	Group A Conventional Haemorrhoidectomy	Group B MIPH	Total
Female	14	12	26
Male	20	22	42
Total	**34**	**34**	**68**

P-value: 0.6177

In Conventional Haemorrhoidectomy, 14 (41.2%) patients were Female and 20 (58.8%) patients were Male.

In MIPH, 12 (35.3%) patient was Female and 22 (64.7%) patients were Male.

Association of Sex with Procedure was not statistically significant (p=0.6177).

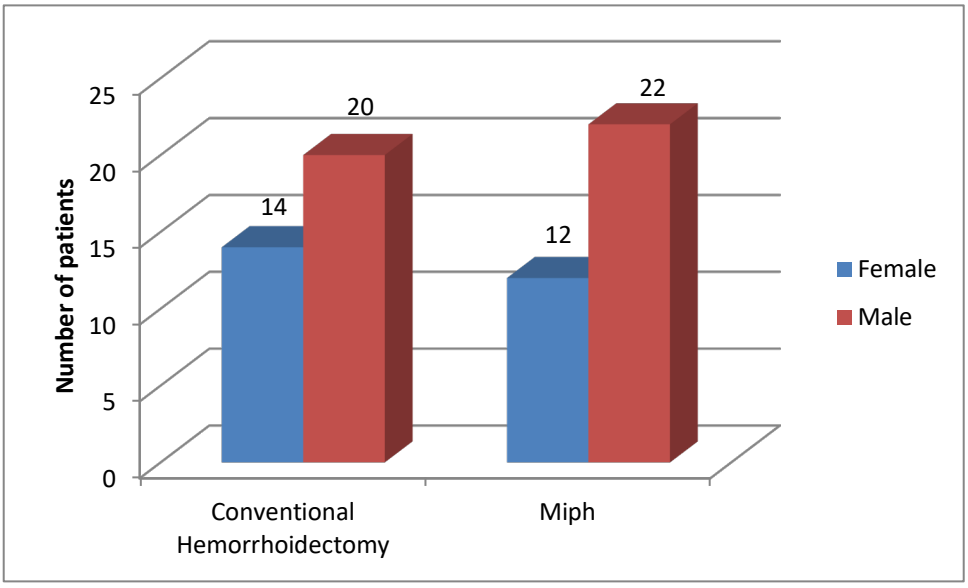


Table 4: Pre-operative Bleeding P/R

Pre-Operative Bleeding P/R	Number of Patients
No	41
Yes	27
Grand Total	**68**

In this study, 41(60.29%) patients complained of bleeding per rectal pre-operatively whereas, 27 (39.71%) patients had no significant pre-operative complaint of bleeding per-rectally.

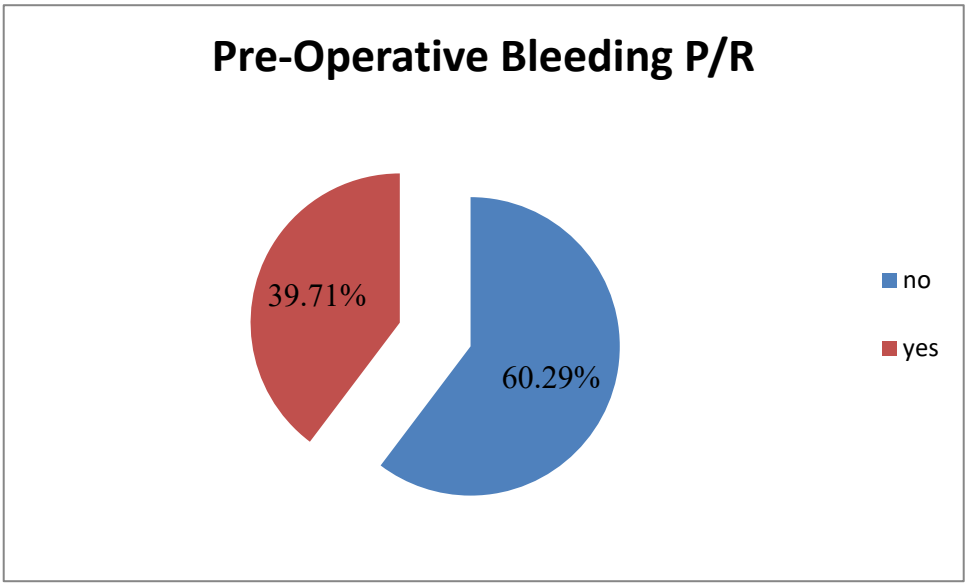


Table 5: Pre-operative Mass P/R

Prolapse P/R	Number of Patients
No	11
Yes	57
Grand Total	**68**

Out of total 68 study population, 11 (16.18%) didn't complain about mass coming out of rectum and rest 57 (83.82%) did complain about mass coming out of rectum.

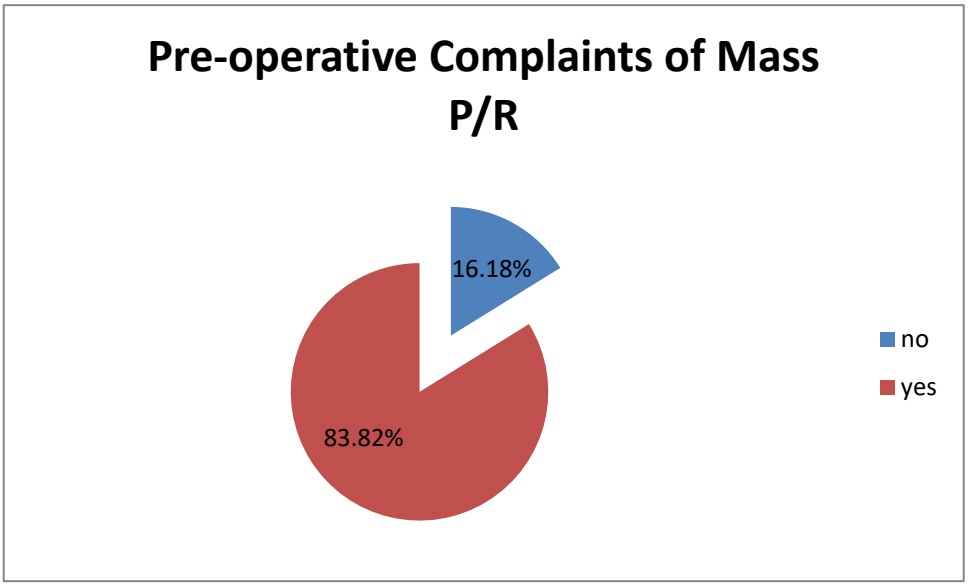


Table 6: Association between Grade of Haemorrhoids and Procedure

Diagnosis	Group A Conventional Haemorrhoidectomy	Group B MIPH	Total
Grade 2 Haemorrhoids	6	5	11
Grade 3 Haemorrhoids	17	19	36
Grade 4 Haemorrhoids	11	10	21
Total	34	34	68

P-value: 0.8158

In Conventional Haemorrhoidectomy, 6 (17.64%) patients had Grade 2 Haemorrhoids, 17 (50.0%) patients had Grade 3 Haemorrhoids and 11 (32.35%) patients had Grade 4 Haemorrhoids.

In MIPH, 5 (14.71%) patients had Grade 2 Haemorrhoids, 19 (55.88%) patients had Grade 3 Haemorrhoids and 10 (29.41%) patients had Grade 4 Haemorrhoids.

Association of Diagnosis with Procedure was not statistically significant (p=0.8158).

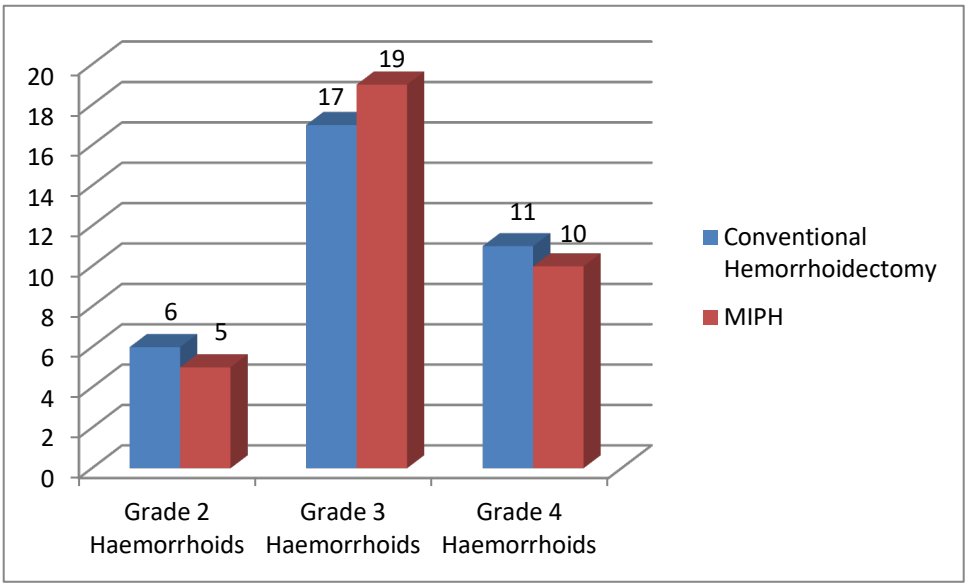


Table 7: Need of Colonoscopy in both the groups pre-operatively

Colonoscopy	no	yes	Grand Total
Group A Conventional Haemorrhoidectomy	30	4	34
Group B MIPH	32	2	34
Grand Total	**62**	**6**	**68**

P-value: 0.422

It was observed in our study that, 4 patients of group A conventional haemorrhoidectomy and 2 patients from group B MIPH had underwent colonoscopy pre operatively to confirm the diagnosis.

No other pathology was detected during these colonoscopies except haemorrhoids, so these cases were included in the study.

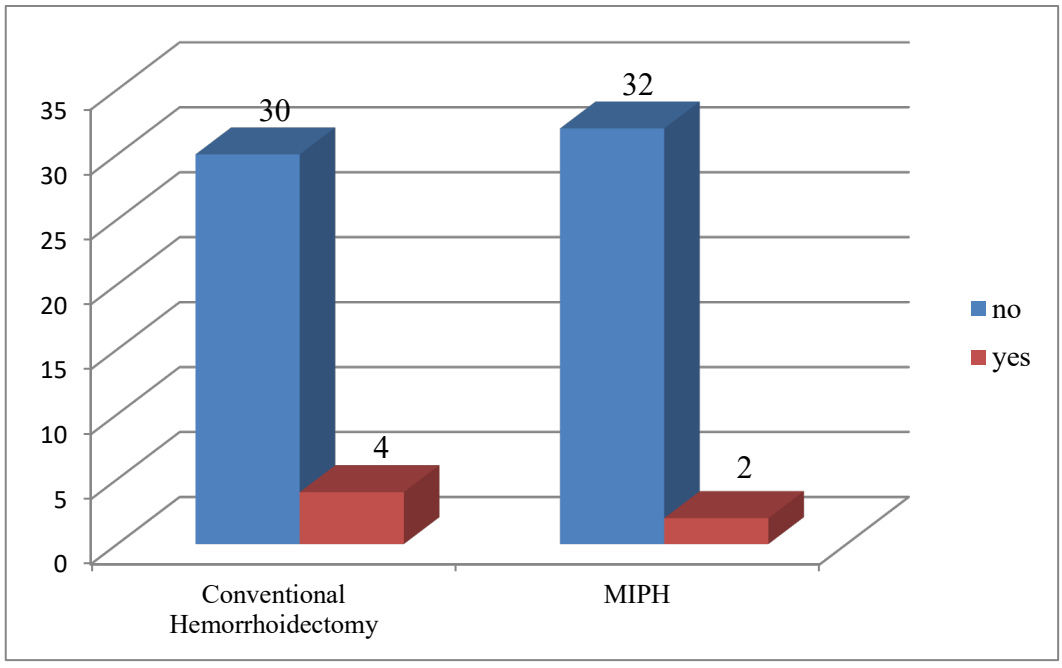


Table 8: Comparison of the Mean Haemoglobin in Both the Groups

Haemoglobin level	Procedure	Number	Mean	SD	Min	Max	Median	p-value
Haemoglobn gm/dl	**Conventional Haemorrhoidectomy**	34	10.241	1.2378	7.1000	12.7000	10.250	0.5396
	MIPH	34	10.434	1.2789	7.2000	12.6000	10.200	

In Conventional Haemorrhoidectomy, the mean Haemoglobin (mean± s.d.) of patients was 10.2441± 1.2378 gm/dl.

In MIPH, the mean Haemoglobin (mean± s.d.) of patients was 10.4324± 1.2789 gm/dl.

Comparing mean haemoglobin with both procedure groups was not statistically significant (p = 0.5396).

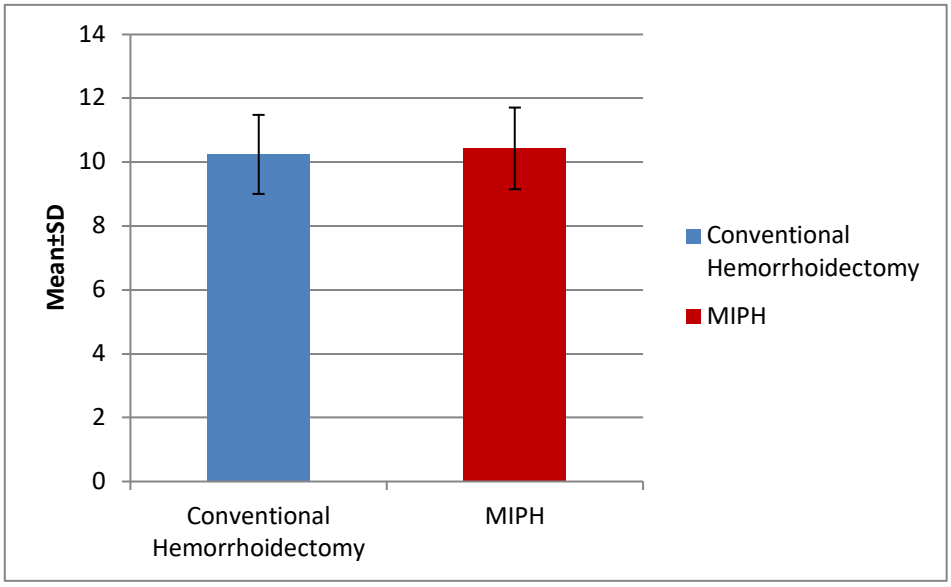


Table 9: Comparison between the Mean PT of Both the Groups

	Procedure	Number	Mean	SD	Min	Max	Median	p-value
PT (min)	**Conventional Haemorrhoidectomy**	34	13.8941	.9028	12.5000	15.7000	13.8500	0.1387
	MIPH	34	14.1912	.7217	12.9000	15.7000	14.2000	

In Conventional Haemorrhoidectomy, the mean PT (mean ± s.d.) of patients was 13.8941± 0.9028 min.

In MIPH, the mean PT (mean ± s.d.) of patients was 14.1912 ± 0.7217 min.

Distribution of mean PT with Procedure was not statistically significant (p=0.1387).

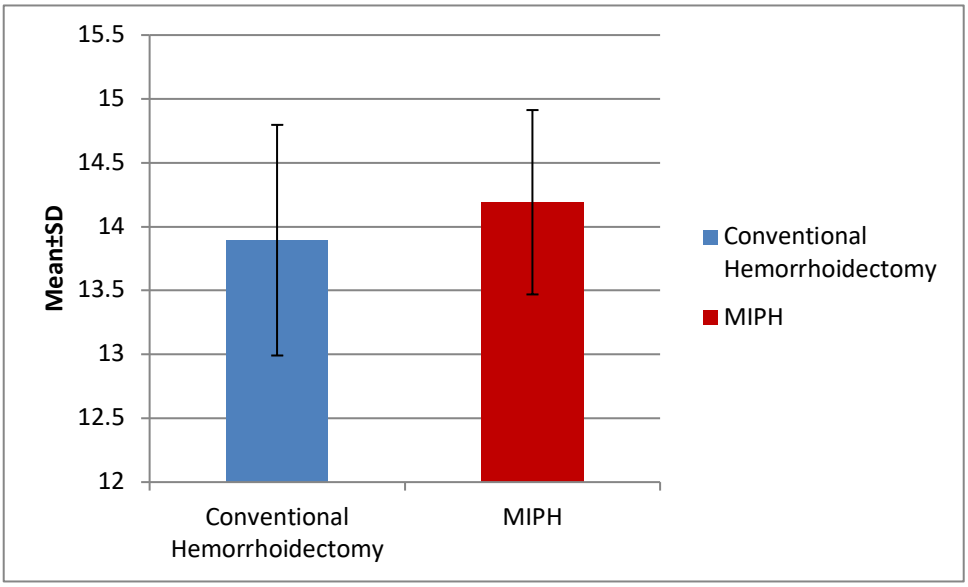


Table 10: Comparison between the Mean INR of Both the Groups

	Procedure	Number	Mean	SD	Min	Max	Median	p-value
INR	**Conventional Haemorrhoidectomy**	34	1.1288	.1690	1.0000	1.7000	1.0750	0.1604
	MIPH	34	1.1806	.1289	1.0000	1.5000	1.2000	

In Conventional Haemorrhoidectomy, the mean INR (mean± s.d.) of patients was 1.1288± 0.1690.

In MIPH, the mean INR (mean± s.d.) of patients was 1.1806± 0.1289.

Distribution of mean INR with Procedure was not statistically significant (p=0.1604).

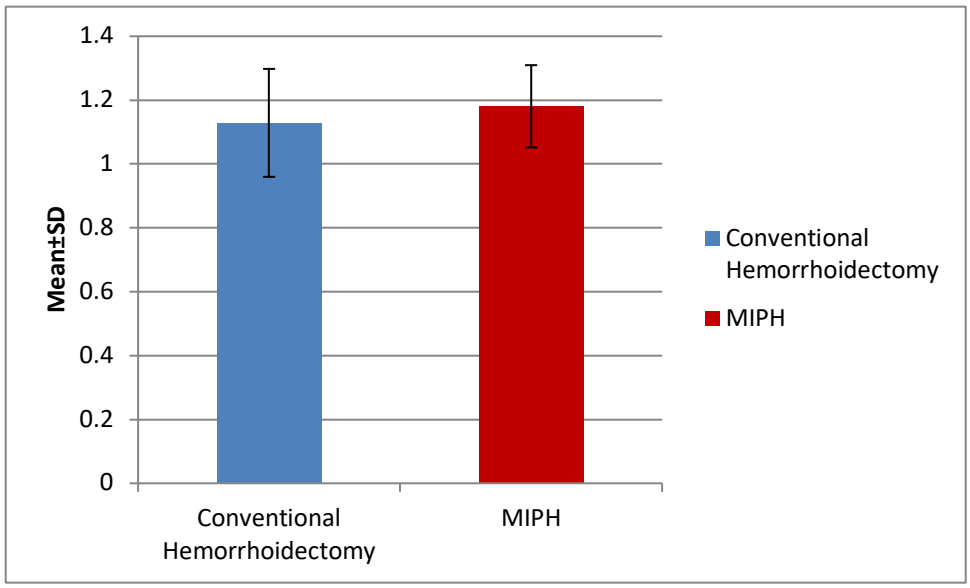


Table 11: Association between Blood transfusion and Procedure

Blood Transfusion	Group A Conventional Haemorrhoidectomy	Group B MIPH	Total
No	29	30	59
Yes	5	4	9
Total	**34**	**34**	**68**

P-value: 0.72045

In Conventional Haemorrhoidectomy, 5 (14.7%) patients had Blood Transfusion.

In MIPH, 4 (11.8%) patients had Blood Transfusion.

Association of Blood Transfusion with Procedure was not statistically significant (p=0.72045).

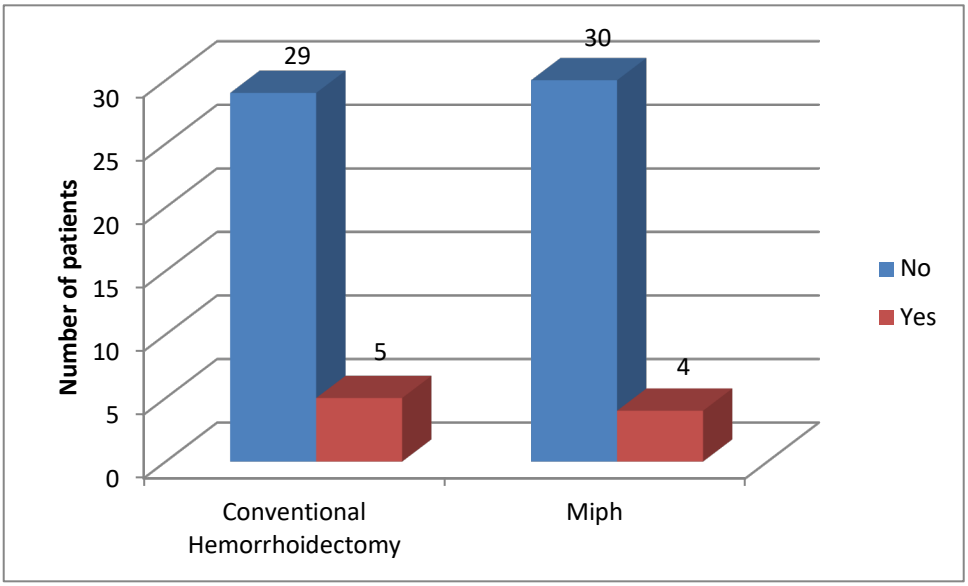


Table 12: Association between types of MIPH gun used in MIPH procedure

Types of MIPH Gun Used	Number of Patients	Percentage
Ethicon	13	38.24%
Axon	8	23.53%
Meril	13	38.24%
Grand Total	**34**	**100.00%**

P-value :< 0.0001

In MIPH group, during 13 (38.2%) cases, Ethicon Guns were used, in 8 (23.5%) cases, Axon system used and Meril gun systems were used in 13 (38.2%).

Association of Type of MIPH Gun with MIPH Procedure was statistically significant (p < 0.0001).

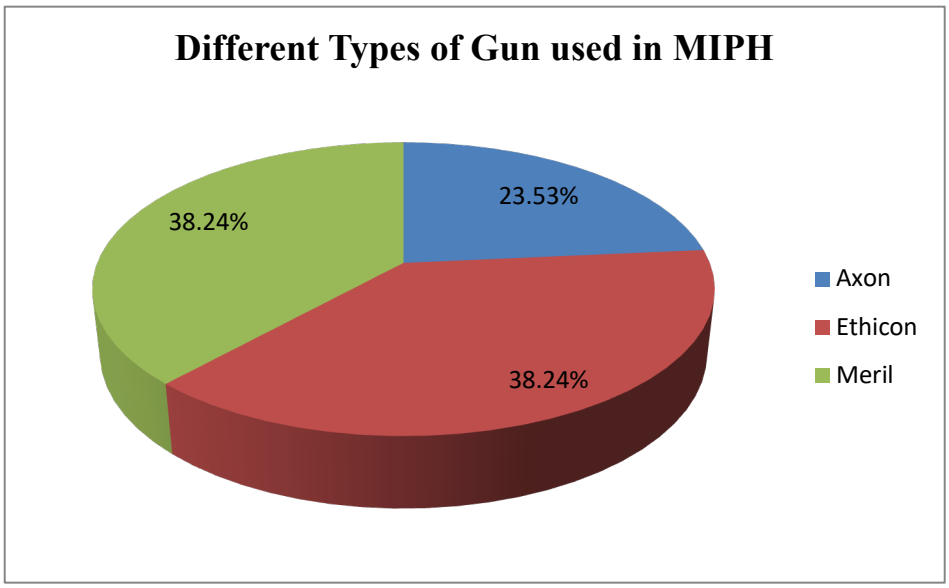


Table 13: Comparison between the Mean Duration of Operation (minutes) in Both the Groups

	Procedure	Number	Mean	SD	Min	Max	Median	p-value
Operation Time (minutes)	**Conventional Haemorrhoidectomy**	34	39.5000	9.9826	23.0000	65.0000	39.0000	<0.0001
	MIPH	34	19.2353	9.1289	10.0000	60.0000	18.0000	

In Conventional Haemorrhoidectomy, the mean Operation (minutes) (mean ± s.d.) of patients was 39.5000± 9.9826.

In MIPH, the mean Operation (minutes) (mean± s.d.) of patients was 19.2353± 9.1289.

Distribution of mean Operation (minutes) with Procedure was statistically significant ($p < 0.0001$).

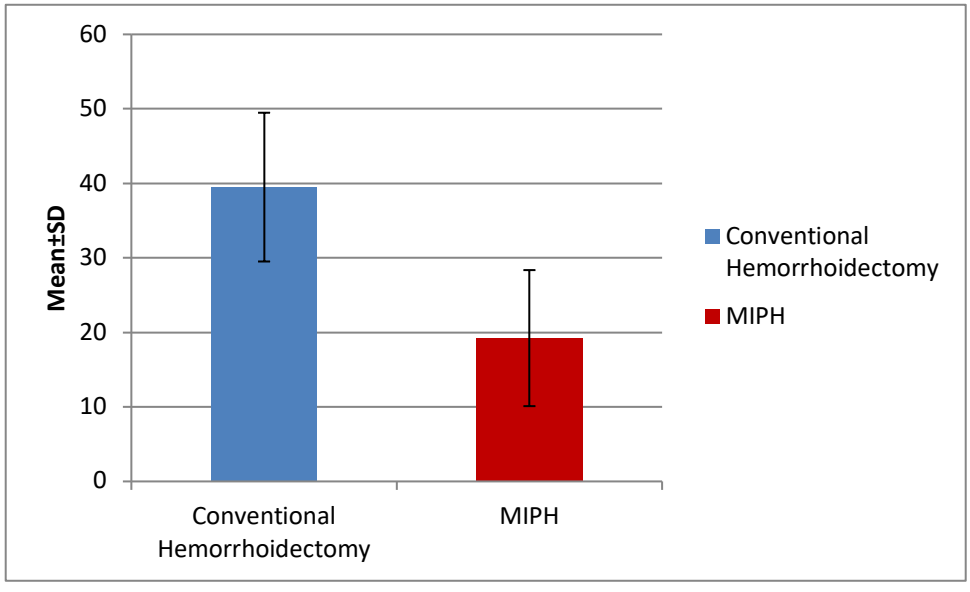


Table 14: Comparison between the Mean Soaked Gauzes Used in Both the Procedures

	Procedure	Number	Mean	SD	Minimum	Maximum	Median	p-value
Gauzes used	**Conventional Haemorrhoidectomy**	34	30.6471	3.3923	25.0000	38.0000	30.0000	<0.0001
	MIPH	34	7.1176	1.4092	3.0000	9.0000	7.0000	

In Conventional Haemorrhoidectomy, the mean Mop/Gauge used (mean± s.d.) of patients was 30.6471 ± 3.3923 pieces.

In MIPH, the mean Mop/Gauge used (mean± s.d.) of patients was 7.1176± 1.4092 pieces.

Distribution of mean Mop/Gauge used with Procedure was statistically significant (p<0.0001).

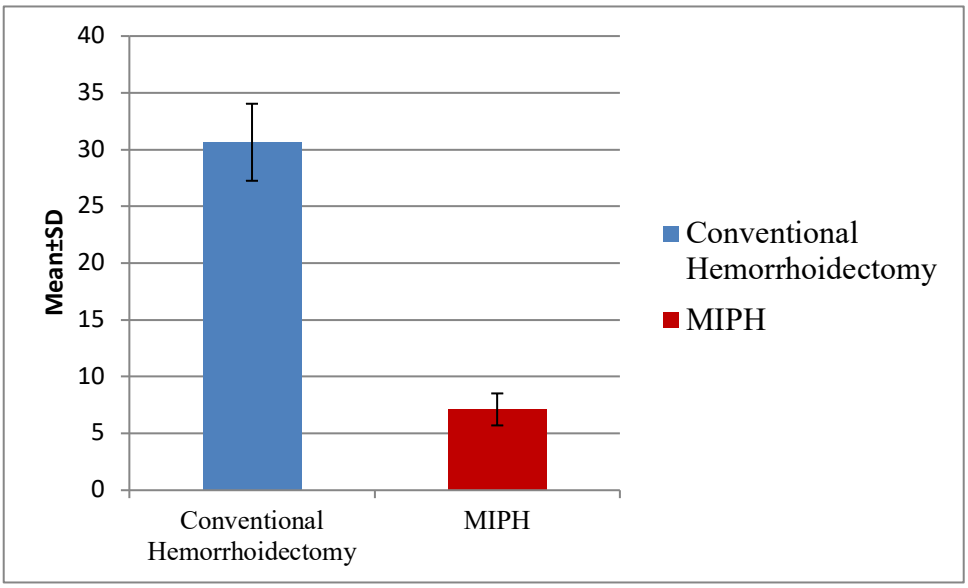


Table 15: Association between Instrument breakage and MIPH Procedure

Instrument Breakage	Number	Percentage
No	33	97.06%
Yes	1	2.94%
Grand Total	**34**	**100.00%**

P-value: < 0.0001

In MIPH, 1 (2.94%) patients undergoing MIPH had Instrument Breakage.

Association of Instrument Breakage with Procedure was statistically significant (p<0.0001).

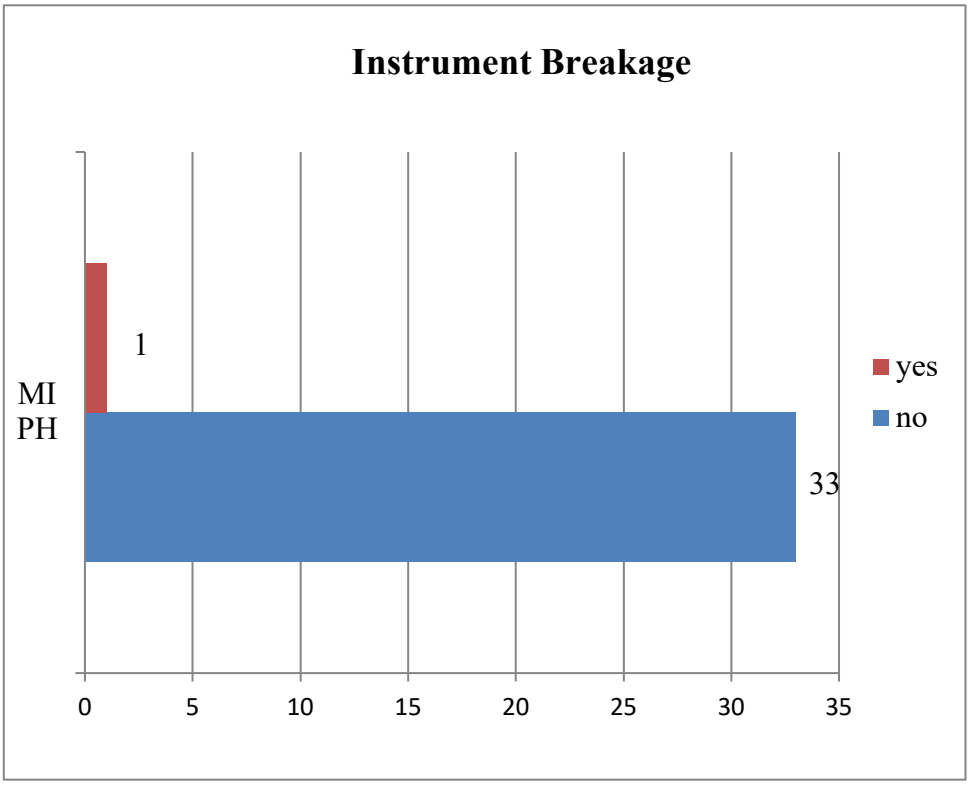


Table 16: Association between incomplete stapling and MIPH

Incomplete Stapling	Number of Patients	Percentage
no	33	97.06%
yes	1	2.94%
Total MIPH	**34**	**100.00%**

P-value: < 0.0001

In MIPH, 1 (2.94%) patients out of 34 patients undergoing MIPH had Incomplete Stapling.

Association of Incomplete Stapling with Procedure was statistically significant (p<0.0001).

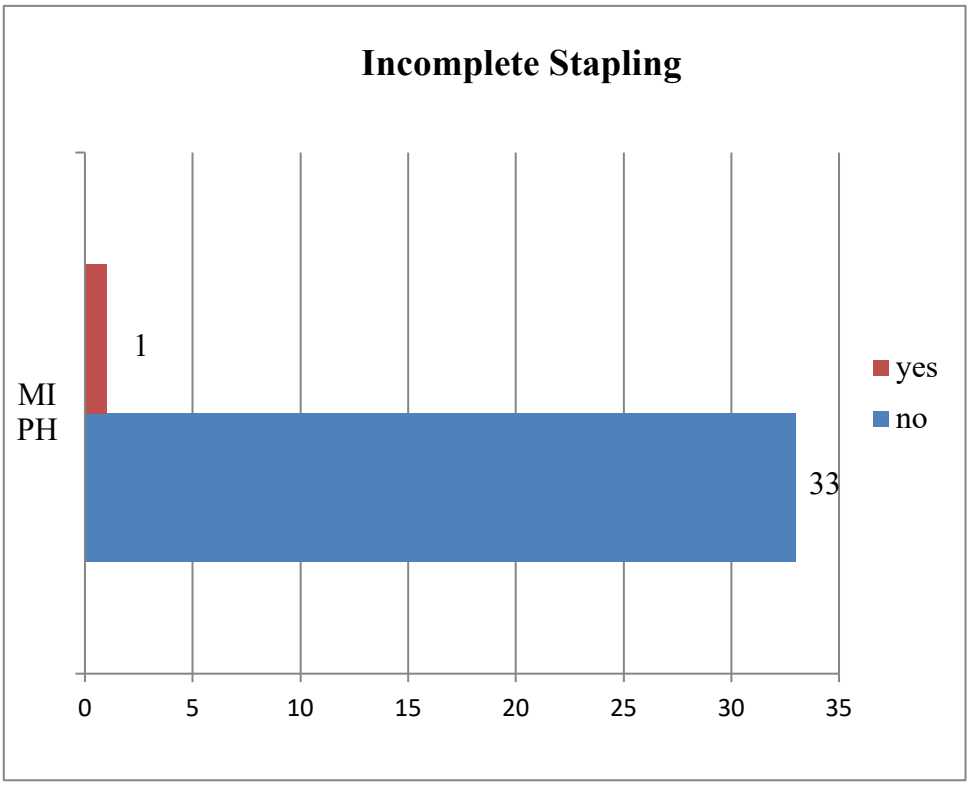


Table 17: Comparison between the Mean VAS Scoring on POD 1 in Both Procedure Groups

	Procedure	Number	Mean	SD	Min	Max	Median	p-value
VAS Score on POD 1	**Conventional Haemorrhoidectomy**	34	5.6471	.8836	4.0000	8.0000	6.0000	<0.0001
	MIPH	34	4.3529	.7739	3.0000	6.0000	4.0000	

In Conventional Haemorrhoidectomy, the mean VAS Score on POD 1 (mean± s.d.) of patients was 5.6471± 0.8836.

In MIPH, the mean VAS Score on POD 1 (mean± s.d.) of patients was 4.3529± 0.7739.

Distribution of mean VAS Score on POD 1with Procedure was statistically significant ($p < 0.0001$).

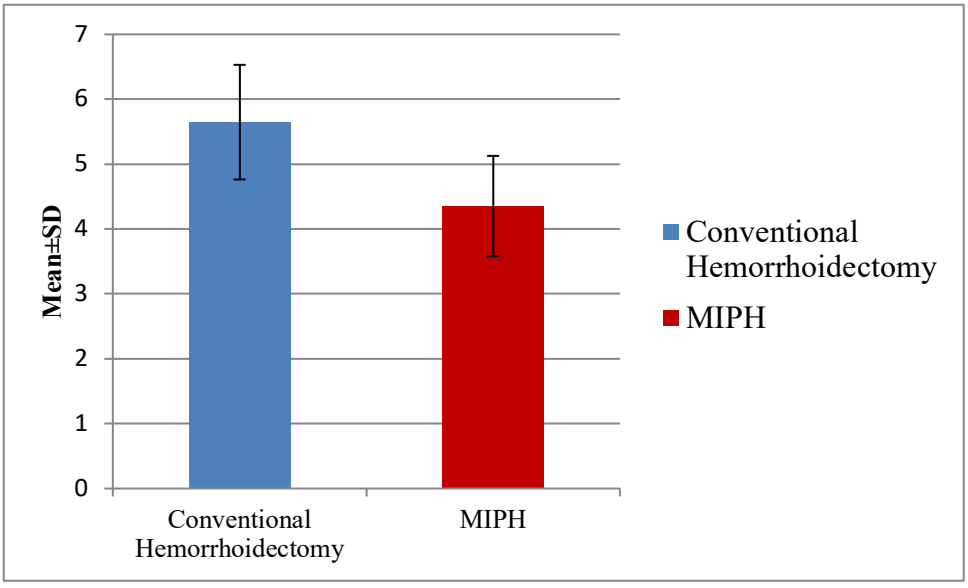


Table 18: Difference between 2 Groups comparing Post Op Haemorrhage

Post Op Haemorrhage	Group A Conventional Haemorrhoidectomy	Group B MIPH	Total
No	30	34	64
Yes	4	0	4
Total	34	34	68

P-value: 0.044

In group A Conventional Haemorrhoidectomy, 4 (11.76%) patients had post op haemorrhage.

In group B MIPH, none had post op haemorrhage.

Difference of post op haemorrhage within the 2 groups was statistically significant ($p < 0.05$).

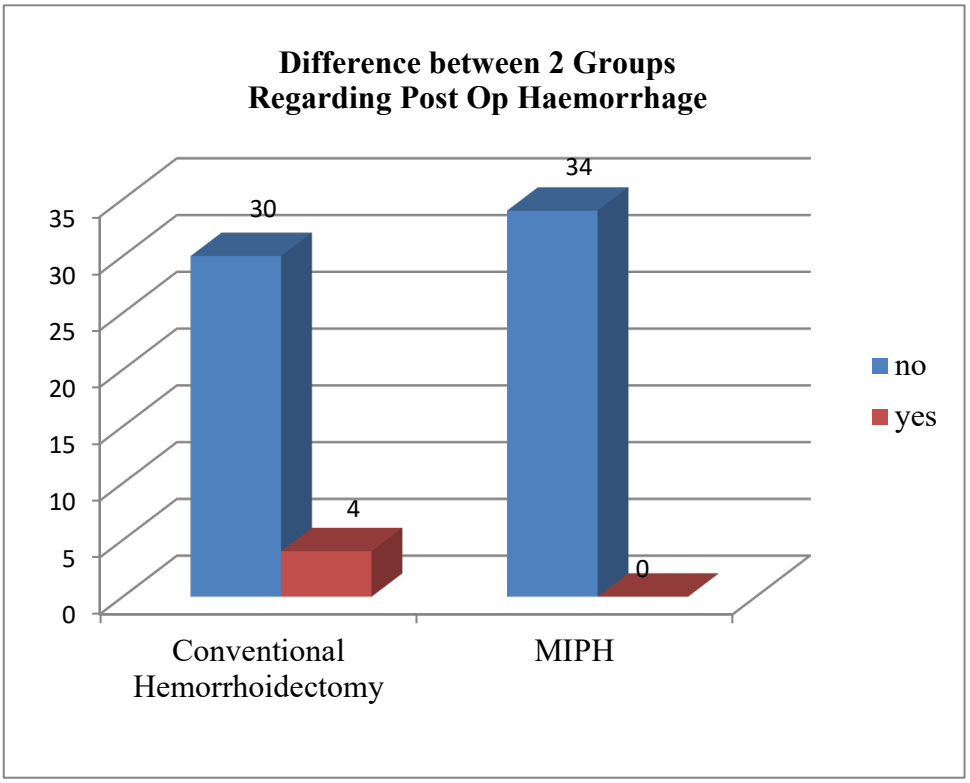


Table 19: Difference between the 2 groups with Respect to Urinary Retention

Procedure	No	Percentage	Yes	Percentage	Total
Group A Conventional Haemorrhoidectomy	30	88.24%	4	11.76%	34
Group B MIPH	34	100.00%	0	0.00%	34
Grand Total	**64**	**94.12%**	**4**	**5.88%**	**68**

P value 0.044

In our study, we have found that 4 (11.76%) patients of group A conventional haemorrhoidectomy suffered from urinary retention post operation but no one from group B MIPH suffered the same fate.

So, there was significant difference in the both group in term of post operative urinary retention ($p < 0.05$)

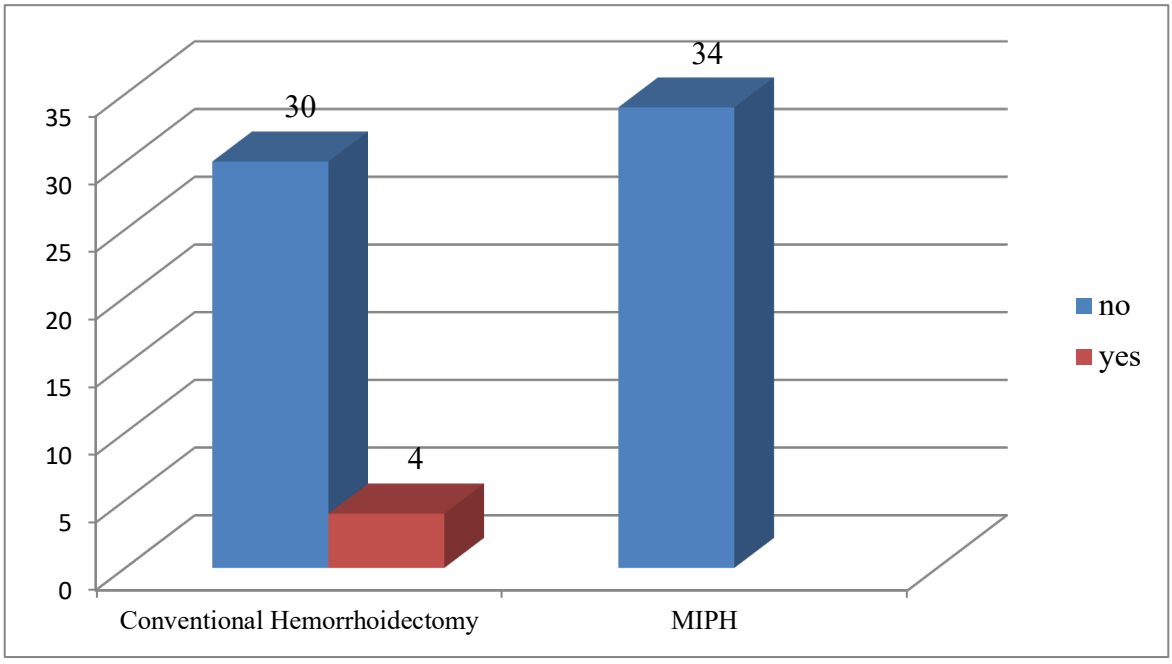


Table 20: Comparison between the Mean Duration Injectable Painkillers Requirement (no of days) in both the Groups

	Procedure	Number	Mean	SD	Min	Max	Median	p-value
Injectable painkillers (no of days)	**Conventional Haemorrhoidectomy**	34	2.5882	0.7434	1.0000	4.0000	2.5000	<0.0001
	MIPH	34	1.2353	0.4306	1.0000	2.0000	1.0000	

In Conventional Haemorrhoidectomy, the mean injectable painkillers (no of days) (mean± s.d.) of patients was 2.5882± 0.7434 days.

In MIPH, the mean injectable painkillers (no of days) (mean± s.d.) of patients was 1.2353± 0.4306 days.

Distribution of mean injectable painkillers (no of days) with Procedure was statistically significant (p<0.0001).

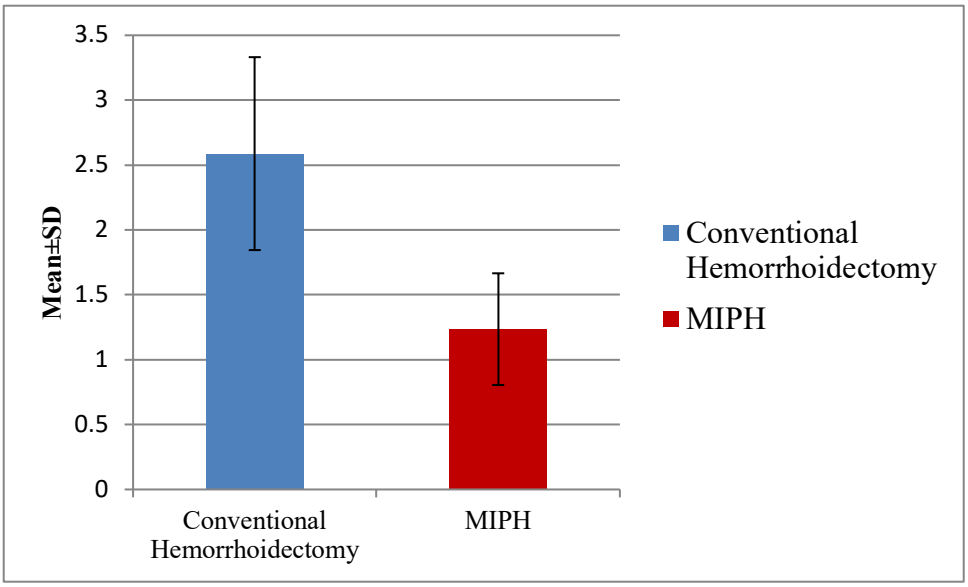


Table 21: Comparison between the Mean Duration of Hospital Stay in both the Groups

	Procedure	Number	Mean	SD	Minimum	Maximum	Median	p-value
Duration of Hospital Stay	**Conventional Haemorrhoidectomy**	34	4.0882	.7535	3.0000	5.0000	4.0000	<0.0001
	MIPH	34	2.4706	.6622	2.0000	4.0000	2.0000	

In Conventional Haemorrhoidectomy, the mean Duration of Hospital Stay (mean ± s.d.) of patients was 4.0882± 0.7535 days.

In MIPH, the mean Duration of Hospital Stay (mean ± s.d.) of patients was 2.4706± 0.6622 days.

Distribution of mean Duration of Hospital Stay with relationship to the Procedures was found to be statistically significant (p<0.0001).

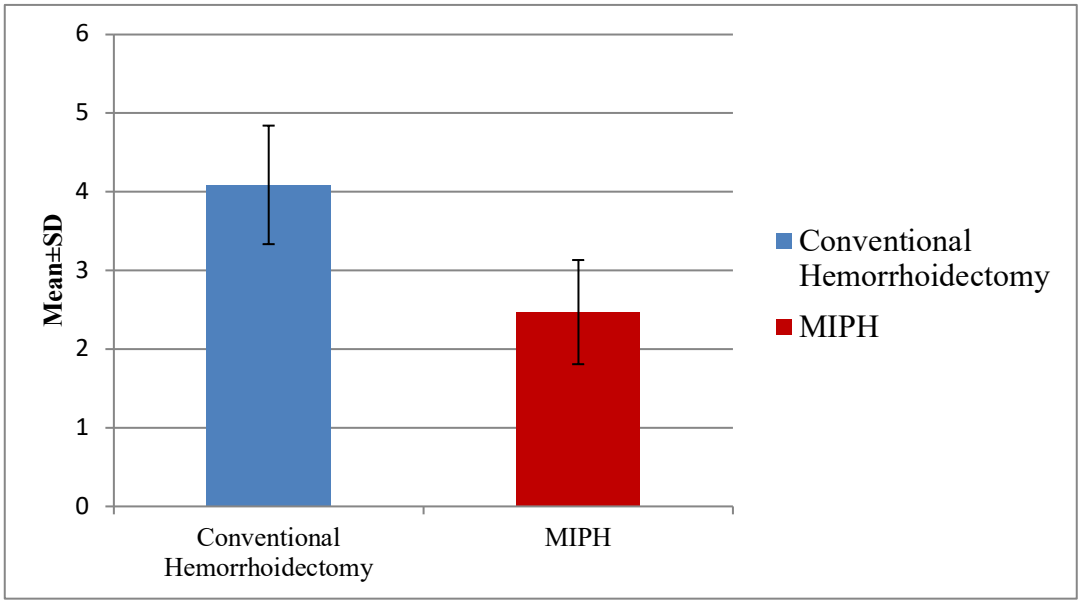


Table 22: Comparison between the Mean VAS Scoring on POD 7 in both the Groups

	Procedure	Number	Mean	SD	Minimum	Maximum	Median	p-value
VAS Score on POD 7	**Conventional Haemorrhoidectomy**	34	1.4412	.5040	1.0000	2.0000	1.0000	0.0002
	MIPH	34	1.0588	.2388	1.0000	2.0000	1.0000	

In Conventional Haemorrhoidectomy, the mean VAS Score POD 7 (mean± s.d.) of patients was 1.4412± .5040.

In MIPH, the mean VAS Score POD 7 (mean± s.d.) of patients was 1.0588± .2388.

Distribution of mean VAS Score POD 7with Procedure was statistically significant (p <0.05).

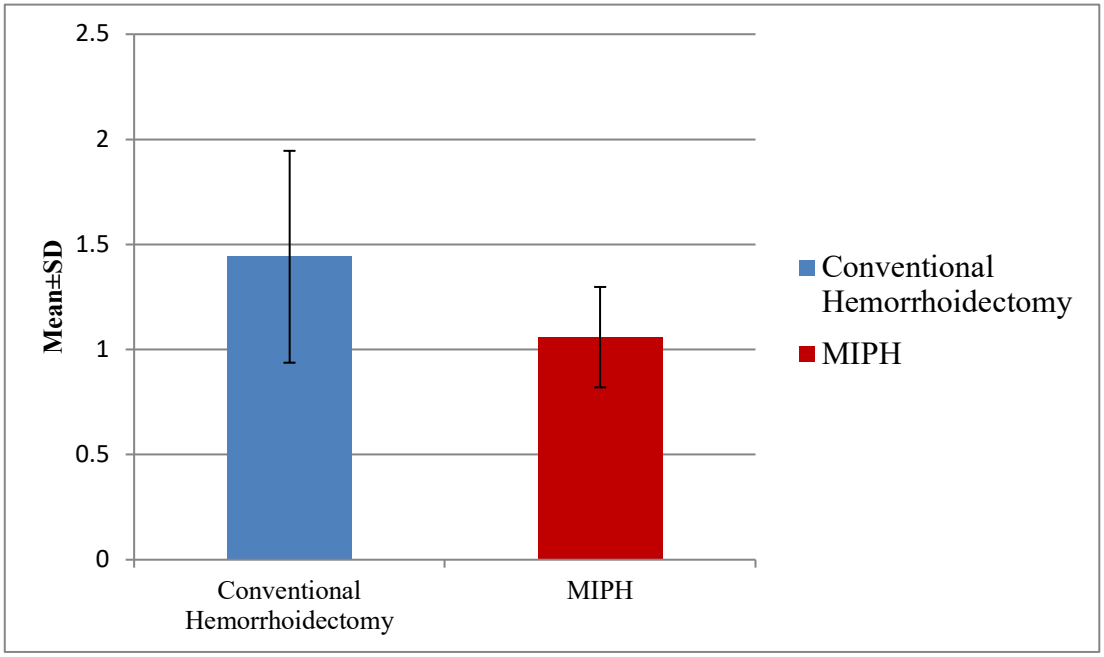


Table 23: Difference between the 2 Groups with Respect to Persisting Pain

Persisting Pain	Conventional Haemorrhoidectomy	MIPH	Total
No	25	33	58
Yes	9	1	10
Total	**34**	**34**	**68**

P-value:0.009

In Conventional Haemorrhoidectomy, 9 (26.5%) patients had pain persisting till follow up on POD 30.

In MIPH, 1 (2.94%) patients had pain persisting till POD 30.

So, the difference in the both group in term of pain persisting till POD 30 on follow ups was statistically significant ($p < 0.05$).

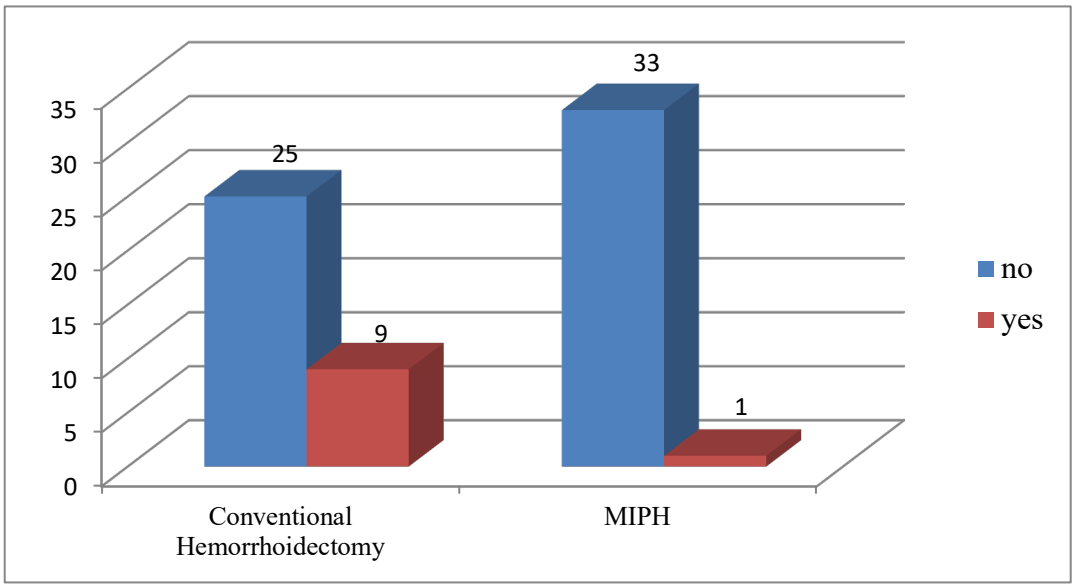


Table 24: Difference between 2 groups with respect to stenosis

Stenosis	Group A Conventional Haemorrhoidectomy	Group A Percentage	Group B MIPH	Group B Percentage	Total
No	32	94.12%	34	97.06%	66
Yes	2	5.88%	0	0%	2
Total	**34**	**100%**	**34**	**100%**	**68**

P-value: 0.160

In group A conventional haemorrhoidectomy, 2 (5.9%) patient had post operative anal stenosis where as in group B MIPH none suffered this complication.

Therefore, the difference in the both group in term of anal stenosis was not statistically significant ($p > 0.05$).

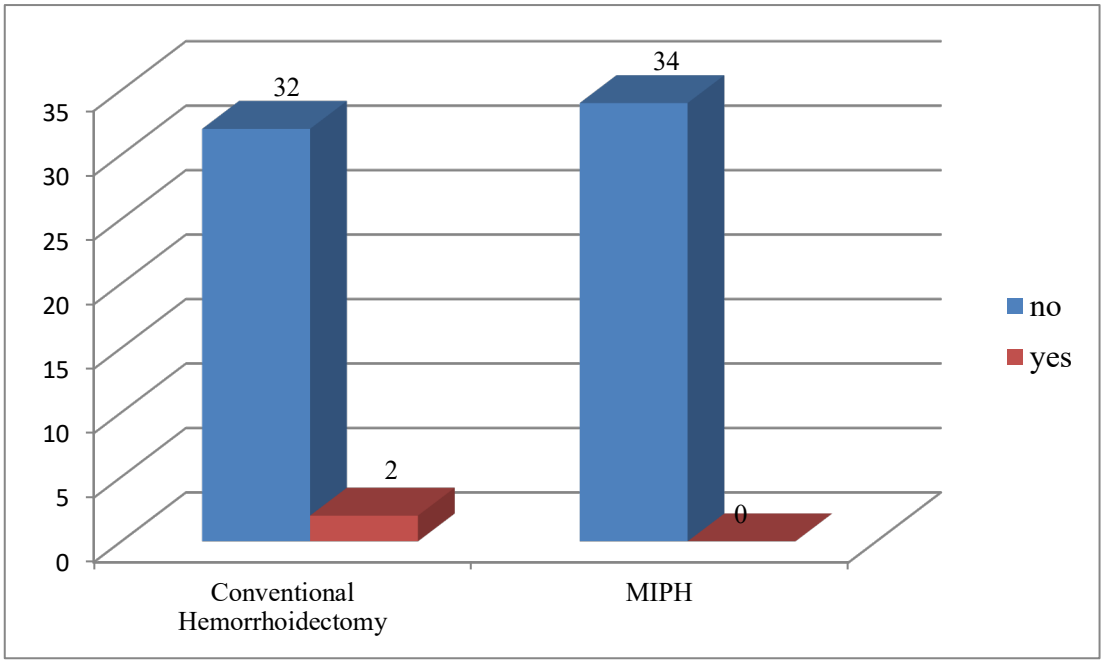


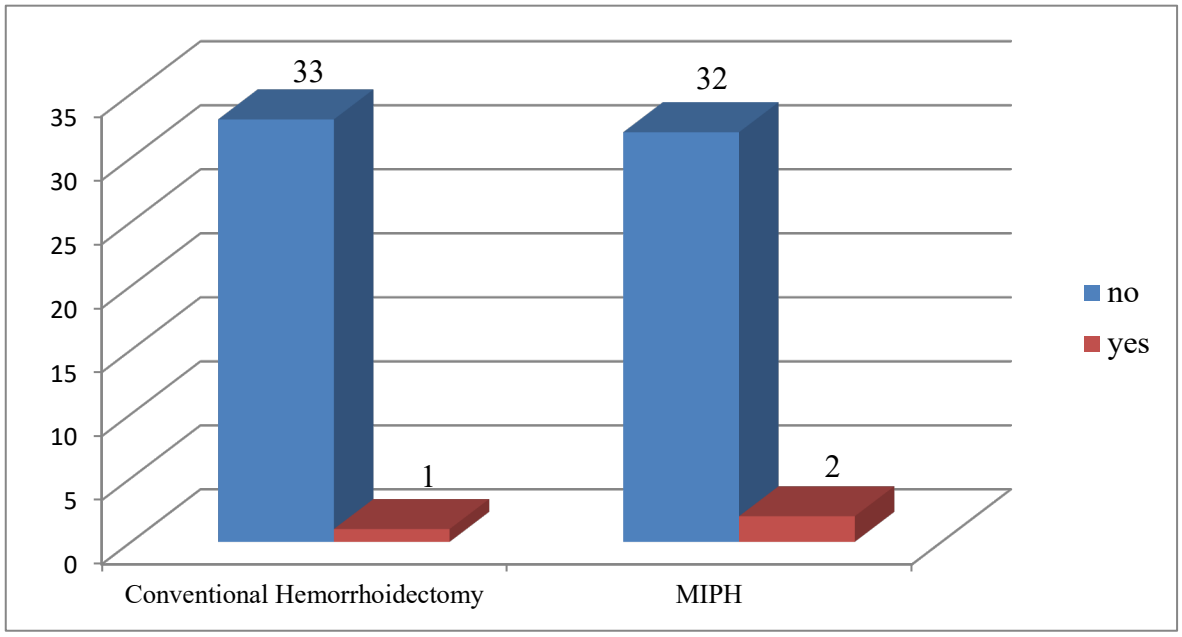
Table 25: Difference between the 2 Groups with Respect to Recurrence

Recurrence	Group A Conventional Haemorrhoidectomy	Group A Percentage	Group B MIPH	Group B Percentage	Total	Total Percentage
No	33	97.06%	32	94.12%	65	95.59%
Yes	1	2.94%	2	5.88%	3	4.41%
Total	**34**	**100%**	**34**	**100%**	**68**	**100%**

P-value: 0.571

1 (2.94%) patient from group A conventional haemorrhoidectomy and 2 (5.88%) from group B MIPH had recurrence.

Thus, there was no significant difference in the both group in term of recurrence (p >0.05).



DISCUSSION SUMMARY AND CONCLUSION

DISCUSSION

In this study, prospective comparative analysis of all the patients with haemorrhoids undergoing conventional haemorrhoidectomy or MIPH was performed on the basis of multiple peri-operative factors and relevant observations. This study was continued for one year period. Data analysis was done and compared to other studies on the similar topics after due research and enumerated below.

Study Population

Total study population was taken to be 68, dividing them in group A and B according to the patients' choice. Group A patients underwent conventional haemorrhoidectomy whereas, the patients of group B underwent MIPH.

There are multiple studies with similar range of study population. **Khanna R *et al.*** had conducted their study with 48 patients dividing them into groups of 28 and 20.[53] **Thirumalagiri V R *et al.*** completed their study with 45 patients; on the other hand,[59] **Patel *et al.*** incorporated 60 patients.[60] The maximum study population is found in a study conducted by **Zhang C *et al.*** having 1003 patients.[70]

Age Range

Any patient with haemorrhoids requiring surgery from age group 18 to 65 years has been included in this study.

Likewise, **Patel *et al.*** have taken patients from 18 – 60 years in their study,[60] whereas, **Gupta S *et al.*** had incorporated patients from age range of 18 to 65 years just like our study.[63] Going out of the box, study done by **Malyadri N *et al.*** had included 28 years to 40 years old patients.[68]

Age Distribution

In this study, the maximum number of patients belonged to the age group of 30-39 years – 18 patients (26.47%). Second highest number of patients e.g. 17 (25%) fell into the age group of 60-65 years. 3rd highest age group was 40-49 years with a patient count of 15 patients. The

mean age of the study group A conventional haemorrhoidectomy was 45.740 ± 12.209 years and for group B MIPH was found to be 48.090 ± 13.608 years.

In other comparable studies, **Thirumalagiri *et al.*** published the mean age of the study as 45.8 ± 13.8 years not mentioning individual means for the open haemorrhoidectomy group and MIPH group.[59] **Gupta S *et al.*** calculated the mean of the Milligan-Morgan group and MIPH group to be 46.10 ± 12.92 years and 44.77 ± 13.42 years respectively.[63] All these contemporary studies showed mean age very close to this study.

Gender Distribution

In this study, 26 (41.2%) out of 68 patients were females and rest 42 (58.8%) were males with a p value of 0.6177. there was no discernible significance in gender distribution.

Thirumalagiri *et al.* showed a sex distribution of 69% males and 31 % females in their study.[59] **Sarangi C *et al.*** observed 62.5% male preponderance in relation to 37.5% female.[64] **Malyadri N *et al.*** documented that 62.5% & 60% male predisposition for MIPH and open haemorrhoidectomy and opposite spectrum, 37.5% and 40% distribution for females in the same groups. P value was 0.818 – statistically insignificant just like our study.[68] **Sadeghi P M *et al.*** endorsed male gender distribution of 65.40% and67.3% respectively in SH and conservative haemorrhoidectomy group with p value calculated 0.722 (evidently insignificant).[64]

Clinical Presentation

It was found that among the total study population of 68 patients, 27 (39.71%) patients complained of painless fresh bleeding per rectum while defecation pre-operatively and 57 (83.82%) had primary complaint of mass coming out of rectum on defecation or straining or permanently prolapsed. We were able to identify 19 (27.94%) patients who had problem of both the bleeding and mass p/r on presentation.

Similarly, all contemporary study has supported our study on the clinical presentations of the patients suffering from haemorrhoids.

Duration of Operation

Mean duration of operation in the both groups was a significant factor for comparison. The mean duration of operation was noted for group A to be 39.5000 ± 9.9826 minutes and group B to be 19.2353 ± 9.1289 minutes. P value < 0.0001 for this parameter was statistically.

Thirumalagiri *et al.* used all the data available to compute and showcased the mean operation time for open haemorrhoidectomy and MIPH groups as 36.2 ± 6.5 minutes and 28.76 ± 3.5 minutes respectively which yielded p value of < 0.005 making it significant.[59] **Gupta S *et al.*** also emphasized on operation time to be statistically significant while comparing both the group of open haemorrhoidectomy or MIPH (Group A 46.10 ± 12.92 minutes vs. 44.77 ± 13.42 minutes).[63] **Malyadri N *et al.*** reached the conclusion of the operation time being a significant difference point in comparison of the both group with p < 0.001.[68] **Zhang C *et al.*** published the mean time for surgery in conventional group as 29.7 ± 6.3 minutes and MIPH group as 14.5 ± 5.8 minutes and p value as < 0.001 (highly significant) in a larger sample size. Thus all this study corroborate with our study.[70]

Intra Operative Blood Loss

We have opted for weighing the mean standard gauze pieces used in surgery to indicate the intra-op blood loss. Conducting this study, we land to fact the mean gauze pieces count in operation were turned up to be like 30.6471 ± 3.3923 pieces vs. 7.1176 ± 1.4092 pieces. P value was found <0.0001 which highly significant.

Other contemporary similar studies that we could find, shows comparison of the intro op blood loss but many had directly mentioned intra op blood loss in a straight forward manner. **Vinayaka NS *et al.*** had documented intra operative blood loss and derived p value < 0.001. But they have compared Ligasure vs. open haemorrhoidectomy groups.[61] **Sarangi C *et al.*** wrote average blood loss of 65.8 ml in MIPH group and 154 ml in open haemorrhoidectomy group and calculation showed significant difference.[64] **Malyadri N *et al.*** declared median blood loss in SH group as 5 ml and CH group as 38 ml.[68] So, in short, all of these studies, inferred that the blood loss during conventional haemorrhoidectomy is significantly higher than MIPH alike our study.

Instrumental Malfunction

Though we have used standard MIPH kit during the operation, we have recorded one case of instrument breakage and incomplete stapling. In this patient, manual suturing of the mucosa was done with 3-0 prolene round body suture material. This event was statistically significant. That's why we stopped using that specific brand of MIPH gun system ant switched to another standard commercially available MIPH gun system.

No such studies could be found where instrumental malfunction has been mentioned to compare.

Post operative patient comfort

We have decided to evaluate the pain scoring and relative post operative comfort for the patients by employing the widely used VAS scoring on POD 1 and 7. We have discovered that the mean VAS scoring for group A and B on the POD 1 were 5.6471 ± 0.8836 and 4.3529 ± 0.7739 and on POD 7 were 1.4412 ± .5040 and 1.0588 ± .2388 respectively. SPSS software had shown the p value < 0.0001 and 0.0002 making both factors significant in difference for both the group. All this suggests that the patients, who underwent MIPH, were more comfortable in the post op then the patient of conventional haemorrhoidectomy group.

Similarly, all the available studies on the same topic had used VAS in post operative period to measure patient comfort. **Thirumalagiri *et al.*** documented mean VAS 3.5± 2 for MIPH group and 5.7 ± 2.2 for conventional haemorrhoidectomy group on POD 3 corroborating with our study.[59] **Gupta S *et al.*** calculated mean VAS scoring in the open haemorrhoidectomy and MIPH group as follows: 5.67 ± 0.45 and 2.10 ± 0.55 on POD 1 and 3.30 ± 0.47 and 1.00 ± 0.1 on POD 7 respectively with an estimated p value of < 0.01.[63] But **Sadeghi PM *et al.*** had also endorsed the statistically insignificant (p value < 0.448) difference between conventional and MIPH group with a recorded VAS scoring 8.5 ± 1.3 and 7.2 ± 0.8.[69] **Malyadri N *et al.*** had published records of median VAS scoring of 3 and 5 for SH and OH group without mentioning the p value.[68]

Post Operative Haemorrhage

We have observed 4 from conventional haemorrhoidectomy group and none from MIPH group suffered from post operative haemorrhage after removing the anal packing on POD 1 that required necessary management to control the bleed. The difference between the two groups comparing post-op haemorrhage is statistically significant with a p value 0.044.

Comparing post-operative haemorrhage, **Thirumalagiri*et al.*** registered 9.5% incidence of post op haemorrhage after MIPH and 20.8% after conventional haemorrhoidectomy.[59] **Gupta S *et al.*** found 1pateint after MIPH and 8 after open haemorrhoidectomy with a significant p value < 0.05.[63]

Urinary Retention

We have found out that 4 patients in conventional haemorrhoidectomy group A had suffered from urinary retention post surgery but none from MIPH group B had not have any retention of urine. The difference between the two groups in view of urinary retention was significant as the p value was 0.044.

While comparing complications**, Khanna R *et al.*** found in their study 10% patients underwent closed haemorrhoidectomy had suffered from urinary retention. Opposite to our study,[53] **Thirumalagiri *et al.*** 9.5% in MIPH group B and 12.5% in open haemorrhoidectomy group had shown urinary retention which was found statistically insignificant.[59]

Hospital Stay

In our study, it was found that mean hospital stay in group A conventional haemorrhoidectomy was 4.0882 ± 0.7535days and in group B MIPH was 2.4706 ± 0.6622 days. The difference in the mean hospital stay in both the groups was statistically significant (p value < 0.0001). As the average hospital stay and post op VAS scoring were lesser in MIPH group comparing to the conventional haemorrhoidectomy group, the patients underwent MIPH were able to get back to their regular lifestyle way earlier.

We have found that **Thirumalagiri *et al.*** mentioning mean hospital stay in MIPH group was 1.1 ± 0.35 days and in open haemorrhoidectomy group 2.3 ± 1.2 days which was statistically

significant.[59] **Vinayaka N S *et al.*** had mentioned mean hospital stay for open haemorrhoidectomy 10.40 ± 1.52 days.[61] **Gupta S *et al.*** also furnished that there was a significant difference between the mean hospital stay for open haemorrhoidectomy (5.93 ± 1.20 days) and MIPH (2.07 ± 0.024 days) with a p value < 0.001.[63] On the other hand, **Malyadri N *et al* .**gave an account of average hospital stay after MIPH 1 day and open haemorrhoidectomy 3 days. All these studies along with our study established that hospitalization after MIPH is significantly shorter than the conventional haemorrhoidectomy.[68]

Complications

Multiple complications whether early or delayed of the surgeries have been looked for in the post operative period. 26.5% or 9 post op conventional haemorrhoidectomy patients had complained of persisting pain even on POD 30 follow up; whereas, only 1 patient of MIPH group had pain on follow on POD 30. The difference between the 2 groups regarding the pain persisting till POD 30 is statistically significant (p-value 0.009).

Only 2 patients of conventional haemorrhoidectomy group put of all 68 patients had suffered from anal stenosis. Statistical significance of anal stenosis occurrence in the 2 group found to be 0.571 (insignificant).

Comparing recurrence till POD 30, we detected 1 from conventional haemorrhoidectomy group and 2 from MIPH group had recurrence of the hemorrhoids. The difference in between the 2 groups is calculated to be statistically insignificant (p-value 0.571)

All the related studies that we could find, had taken several post op complications into account**. Thirumalagiri *et al*** published in their study that difference between these 2 groups in the same study was again insignificant comparing recurrence and stenosis.[59] **Gupta S *et al.*** had also documented insignificant difference between the 2 groups regarding insentience and recurrence.[63] **Sarangi C *et al.*** had written 5 patients from 40 patients group who underwent MIPH and 12 patients from 40 patients group who underwent open haemorrhoidectomy with p value of < 0.001 statistically significant.[64] Incontinence was found in this study for both the group to have significant difference. **Malyadri N *et al* .**documented 5% from SH and 2.5% from open haemorrhoidectomy with p value 0.556.[68]

So, all these studies have shown that the complications in the MIPH group to be significantly lesser than conventional haemorrhoidectomy group.

SUMMARY

This study's findings could be summarized as follows:

- The mean age of conventional haemorrhoidectomy group and MIPH (Minimal Invasive Procedure for Haemorrhoids) group patients were close to each other
- The maximum number of patients (18 out of 68 patients) of this study belongs to age group of 30-39 years which could be due to defective lifestyle.
- There was no statistical significance found in gender distribution though it was found that the males were more affected than females in this study.
- 57 patients of our study population complained of mass per rectum and 27 complained of bleeding per rectum pre-operatively. Out of all these patients, 19 patients had both mass and bleeding per rectum.
- 36 patients out of 68 total study populations had grade 3 haemorrhoids.
- There was distinct and significant difference the conventional haemorrhoidectomy group and MIPH group when compared on basis of mean operation time and mean soaked gauze pieces. Mean operation time and mean soaked gauze pieces used were significantly lesser in MIPH group than the conventional haemorrhoidectomy group.
- There was 1 case of instrument breakage resulting in incomplete stapling out 34 patients of MIPH group and this was statistically significant.
- The mean VAS scoring on POD 1 and POD 7 of MIPH was significantly lower than those of underwent conventional haemorrhoidectomy.
- There a significant statistical difference found between the 2 groups when post operative haemorrhage is compared with all 4 patients suffering from post operative haemorrhage belonging to the conventional haemorrhoidectomy group.
- Patients from conventional haemorrhoidectomy required longer duration of IV analgesic on an average in post op period comparing to MIPH patients which was statistically significant difference

- The mean hospital stay of conventional haemorrhoidectomy patient was statistically significantly higher than MIPH group where lesser hospital stays were required for MIPH group patients.
- There was a statistically significant difference between the 2 groups regarding the post operative urinary retention as 4 patients of conventional haemorrhoidectomy group had suffered from it in the post-operative period.
- There was significant prevalence of patients comparing of pain persisting till POD 30 follow up in conventional haemorrhoidectomy group than the MIPH group.
- There was no discernible significant difference while comparing recurrence and anal stenosis on follow ups in both the groups.

CONCLUSION

At last, we conclude our study by stating that apart from indisputable added financial burden of the PPH gun kit, MIPH is proved to be superior then conventional haemorrhoidectomy in term of lesser mean duration of operation, lesser intra-op blood loss, lesser requirement of analgesic in post-op period, more patient comfort in terms of reduced pain post operatively, shorter period of hospital stay enabling the patients to return to normal life earlier, with significantly reduced post operative complications (urinary retention, post-operative haemorrhage). Hence, we hereby do recommend using MIPH as one of the best option for surgical treatment for the patients with haemorrhoids requiring surgery with conventional haemorrhoidectomy to be preserved for some unique settings where MIPH is contraindicated.

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PROFORMA

Patient Particulars -

Group: A / B

Name: Age/Sex:

Date of Admission: UHID no:

IPD no.: Occupation:

Address: Height/Weight:

Socio-economic status:

Pre Operative Diagnosis:

Date of surgery:

Date of Discharge:

History -

Chief complaints:

History of presenting illness:

Past history:

Family history:

Co morbidities:

Examination -

General physical examination:

Systemic examination

- CVS:
- RS:
- CNS:
- P/A:

Local examination

P/R:

Proctoscopy:

Investigations -

Complete blood counts: Blood sugar (Random):

Viral Markers:

LFT:

Blood Urea: Serum Creatinine:

Urine (R & M):

Colonoscopy:

Others:

Pre Operative Resuscitation –

Date of Blood Transfusion:

Number of Transfusions:

Operation Details -

Technique:

Anaesthesia:

Operating Surgeon:

Duration:

Intra Operative Findings:

Number of mops/peanuts needed:

Instrumental Malfunction:

Post Operative Diagnosis:

POST OPERATIVE DETAILS

Dressing needed:

Post Operative Haemorrhage:

Urinary Retention:

Pain Score on POD1:

Duration of IV Analgesia Requirement:

Number of days of hospital stay:

FOLLOW UP ON POD7

Date of visit:

Complaints:

Early Complications:

1. Pain:
2. Bleeding P/R:
3. Prolapse:
4. Discharge:
5. Incontinence:
6. Retention of urine:
7. Infection:
8. Others:

FOLLOW UP AT POD30

Date of visit:

Complaints:

Delayed Complications:

1. Anal stricture
2. Recurrence
3. Others

INFORMED CONSENT (English)

SANTOSH MEDICAL COLLEGE AND HOSPITAL, GHAZIABAD

I, _____, Son/Daughter/Wife of _____ resident of _____, hereby do declare that I give my full, free and voluntary informed consent to partake in the thesis **"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HAEMORRHOIDECTOMY VS MIPH".** Dr._____ has informed me to my full satisfaction, in the language I understand, about the purpose, nature of study and various laboratory investigations for the study to be carried out. I have been informed about the duration of the study and instructions to be followed during the study period.

I give full consent for being enrolled in the above study and I reserve my rights to withdraw from this study, whenever I wish without prejudice of my right to undergo further treatment at Santosh Hospital, Ghaziabad U.P.

Patient's/ Patient's relative's signature
Or thumb impression

Doctors signature

Name:

Date:

We have witnessed that the patient signed the above form in the presence of his free will after fully understanding its content.

Signature of Witness

Name:

Relationship:

Signature of Investigator

Name: Dr. Sayandeep Maity

Designation: PGT Department of General Surgery

Contact No.- 8981880248

INFORMED CONSENT (Hindi)

संतोष मेडिकल कॉलेज एवं अस्पताल (गाजियाबाद)

मैं _____ बेटा/ बेटी/ पत्नी_____निवासी _____ घोषणा करता हूं कि डॉ ._____, ने मुझे मेरी भाषा में अपने अध्ययन **"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HAEMORRHOIDECTOMY VS MIPH"** के उद्देश्य के बारे में, और अध्ययन के दौरान अपनाई जाने वाली विभिन्न प्रयोगशाला जांच के बारे में सूचित कर दिया है। मुझे अध्ययनकी अवधि और उसके दौरान अपनाए जाने वाले निर्देश भी मेरी भाषा मे समझा दिए गए हैं| मैं उपरोक्त अध्ययन में बिना किसी दबाव के दाखिला ले रहा हूं और पूर्ण सहमति दे रहा हूं | सन्तोष अस्पताल, गाजियाबाद में अपने आगे के उपचार पर बिना प्रतिकूल प्रभाव डाले इस अध्ययन से और प्रयोगशाला जांच की प्रकृति से मैं जब चाहूँ बाहर जाने के अपने अधिकार को सुरक्षित रख रहा हूं |

रोगी / रोगी के रिश्तेदार के हस्ताक्षर डॉक्टर के हस्ताक्षर

नाम

दिनांक:

मेरी उपस्थिति में मरीज ने पूरी तरह से डाकटर के बताए गए अध्ययन और निर्देशों को समझने के बादअपनी स्वतंत्र इच्छा से ऊपर के फार्म पर हस्ताक्षर किए हैं ।

हस्ताक्षर

नाम: डॉ सायनदीप माइति

पदनाम: पीजी

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संपर्क नंबर- 8981880248

ETHICAL COMMITTEE CLEARANCE CERTIFICATE

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F. No. SU/2021/1830[50] Dated: 17.07.2021

Subject: Grant of Ethical Clearance for Thesis Protocol Topic "**A COMPARATIVE STUDY BETWEEN CONVENTIONAL HEAMORRHOIDECTOMY VS MIPH",** submitted by **Dr. Sayandeep Maity,** MD/MS student of Batch 2020-2021, Department of **General Surgery**.

*****

With reference to his/her request for grant of Ethical Clearance for the Thesis Protocol entitled **"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HEAMORRHOIDECTOMY VS MIPH", Dr. Sayandeep Maity** is informed that the Thesis Protocol submitted by him/her was considered by the **Screening Committee** of the Santosh Medical College & Hospital in its meetings held on 19.03.2021, 22.03.2021, 24.03.2021, 25.03.2021, 26.03.2021, 27.03.2021 and 06.04.2021. The recommendations of the **Screening Committee** were considered in detail by the Institutional **Ethics Committee** in its meeting held on **12.07.2021** and the same was **approved** by the **Ethics Committee**.

He /She is informed accordingly for further necessary action.

[Dr. V. P. Gupta]
REGISTRAR

SANTOSH DEEMED TO BE UNIVERSITY REGISTRAR GHAZIABAD, NCR DELHI

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2. The Dean, SMC&H
3. The Dean – Research
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7. HOD of **General Surgery**

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INTRODUCTION Haemorrhoids are very common in day-to-day general surgery practice. They may be primarily due to human evolution, natural consequences of adaptation of erect posture by mankind, straining to expel constipated stool or secondarily due to carcinoma of rectum, pregnancy, uterine tumor, and chronic constipation, urinary obstruction due to stricture or enlarged prostate and portal hypertension. the prevalence of symptomatic haemorrhoids is calculated to be at 4.4% all over world. It is important to note, while haemorrhoids do not typically affect one gender more than other, women are more prone to report the presence of haemorrhoids to their doctor than men. The ASCRS estimates that less than 10% of the haemorrhoid cases require surgery overall. After a conventional Ferguson's haemorrhoidectomy, a repeat surgery was necessary in 0.8% of cases in large series whereas, in a study with a minimum follow-up of 5 years, recurrence rate was 18.2% and reoperation was performed in 7.2% case of stapled haemorrhoidectomy. Open haemorrhoidectomy has long been regarded by the patients as an inherently painful procedure. Reduction of pain after haemorrhoidectomy is an important goal, with the ultimate aim of reduction in the length of hospital stay and the possibility of day care surgery. Haemorrhoids) is a newer concept which is used to overcome these problems. Stapled haemorrhoidopexy for prolapsing haemorrhoids is having different mechanism of action from excisional haemorrhoidectomy. It does not associated with the pain which is usual occurrence happening after resection of the sensitive anoderm. Both procedures are effective in treating grade 3 and 4 haemorrhoids, however they both present with specific pros and cons as to which is the better suited procedure for a particular case is to be determined as per the respective circumstances. Despite its prevalence and low morbidity, haemorrhoid disease has a high impact on quality of life, and can be managed with a multitude of surgical and nonsurgical treatments. Symptomatic haemorrhoids are one of the commonest surgical afflictions of the Indian population. For grade I and II haemorrhoids conservative medical therapy is usually successful but grade III and IV haemorrhoids require surgical intervention. The non-operative options ranges from rubber band ligation, sclerotherapy, cryotherapy to photocoagulation. However, haemorrhoidectomy of the

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TO WHOM IT MAY CONCERN

This is to certify that the statistical analysis component of the dissertation titled **"A COMPARATIVE STUDY BETWEEN CONVENTIONAL HAEMORRHOIDECTOMY VS MIPH"** done by Dr. Sayandeep Maity, 3rd year post graduate trainee in the Department of General Surgery, Santosh Medical College and Hospital, Ghaziabad, has been conducted under my direct guidance and supervision.

All the statistical calculations of this study are authentic and correct to the best of my knowledge.

Wish him all the success in his life.

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ABBREVIATIONS

1. ASCRS – American Society of Colon and Rectal Surgeons.
2. MIPH – Minimal invasive procedure for haemorrhoids.
3. SH – Stapler haemorrhoidopexy.
4. VAS – Visual analogue scoring.
5. POD – Post operative day.
6. DRE – Digital Rectal Examination.
7. CECT – Contrast Enhanced Computer Tomography.
8. RBL – Rubber Band Ligation.
9. IRC – Infrared Photocoagulation.
10. RFA – Radio Frequency Ablation.
11. LASER – Light Amplified by the Stimulated Emission of Radiation.
12. NdYag – Neodymium-doped Yttrium Aluminum Garnet.
13. PPH – Procedure for prolapse and haemorrhoids.
14. CDC – Center for disease control.
15. LH – LASER haemorrhoidoplasty.
16. OH – Open haemorrhoidectomy.
17. CH – Conventional haemorrhoidectomy.
18. Hb – Haemoglobin.
19. PT – Prothrombin time.
20. INR – International normalized ratio.
21. BT – Blood transfusion.
22. GIT – Gastrointestinal Tract.

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MASTERCHART

S. No.	IP No.	Name	Age	Gender	Bleeding PR	Prolapse PR	Haemoglobin	PT	INR	Blood transfusion	Diagnosis	Procedure	Type of MIPH Gas	Duration Of Operation (mins)	Mega/Gauge used	Instrument breakage	Incomplete stapling	Anal Packing	Post Op Hemorrhage	VAS Score POD 1	Analgesic	Injectable painkillers (no. of days)	Duration Of Hospital Stay	VAS Score POD 7	Bleeding	Recurrence	Stenosis	Incontinence	Portal pyemia	Urinary Retention	Persisting pain	Colonoscopy
1	17100946	Munnilal	36	m	no	yes	12	13.7	1	no	Grade 3 Haemorrhoids	MIPH	A	13	8	no	no	yes	no	6	yes	1	3	2	no	no	no	no	no	no	no	no
2	17124036	Sarita	45	f	yes	yes	7.8	14.2	1.89	yes	Grade 3 Haemorrhoids	MIPH	A	13	7	no	no	yes	no	4	yes	2	2	1	no	no	no	no	no	no	no	no
3	17134582	Poonam	46	f	yes	yes	9.6	15.1	1.65	no	Grade 3 Haemorrhoids	MIPH	ET	12	3	no	no	yes	no	3	yes	1	2	1	no	no	no	no	no	no	no	no
4	17148590	Dayanand	65	m	no	yes	11	15.5	1.65	no	Grade 4 Haemorrhoids	MIPH	ET	45	9	no	no	yes	no	4	yes	2	3	1	no	no	no	no	no	no	no	no
5	17146537	Nasir	43	m	no	yes	10.2	14.4	1.2	no	Grade 4 Haemorrhoids	MIPH	ET	11	3	no	no	yes	no	4	yes	1	3	1	yes	no	no	no	no	no	no	no
6	17193885	Neeraj	32	m	yes	yes	9.9	14.2	1.1	no	Grade 3 Haemorrhoids	MIPH	ET	12	6	no	no	yes	no	3	yes	1	2	1	no	no	no	no	no	no	no	no
7	17100788	Roshanlal	64	m	no	no	12.1	13.4	1.22	no	Grade 2 Haemorrhoids	MIPH	M	18	8	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
8	17100956	Munnilal	65	m	no	yes	12.5	14.6	1.21	no	Grade 3 Haemorrhoids	MIPH	M	17	8	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
9	17177252	Praveen	45	m	no	yes	11.3	13.9	1.23	no	Grade 3 Haemorrhoids	MIPH	M	18	6	no	no	yes	no	3	yes	2	2	1	no	no	no	no	no	no	no	no
10	17189278	Aftab	53	m	no	yes	10.8	14.7	1.24	no	Grade 3 Haemorrhoids	MIPH	M	16	9	no	no	yes	no	6	yes	1	4	1	no	no	no	no	no	no	no	no
11	17213494	Mahendra	62	m	no	yes	11.2	13.6	1.25	no	Grade 4 Haemorrhoids	MIPH	A	15	5	no	no	yes	no	5	yes	1	3	1	no	no	no	no	no	no	no	no
12	17214571	Gautam	48	m	no	yes	10.1	14.2	1.1	no	Grade 4 Haemorrhoids	MIPH	ET	60	9	yes	yes	yes	no	6	yes	1	4	1	no	no	no	no	no	no	no	no
13	17263823	Puneet	38	m	no	yes	9.8	13.6	1.64	no	Grade 3 Haemorrhoids	MIPH	ET	18	7	no	no	yes	no	4	yes	1	2	1	no	yes	no	no	no	no	no	no
14	17243945	O D Sharma	62	m	no	yes	10.2	15.2	1.66	no	Grade 3 Haemorrhoids	MIPH	A	10	8	no	no	yes	no	4	yes	2	3	1	no	no	no	no	no	no	no	no
15	17168746	Ashok	65	m	no	yes	11.2	14.8	1.24	no	Grade 4 Haemorrhoids	MIPH	A	17	8	no	no	yes	no	5	yes	1	2	1	no	no	no	no	no	yes	no	no
16	17254829	Shikha	40	f	no	yes	11.1	15.1	1.5	no	Grade 3 Haemorrhoids	MIPH	A	16	7	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
17	17127438	Vandana	39	f	no	yes	10.1	14.2	1.23	no	Grade 3 Haemorrhoids	MIPH	ET	15	9	no	no	yes	no	3	yes	1	2	1	no	no	no	no	no	no	no	no
18	17126483	SK Gupta	38	m	no	yes	10.2	13.8	1.32	no	Grade 3 Haemorrhoids	MIPH	ET	20	7	no	no	yes	no	4	yes	1	2	1	yes	no	no	no	no	no	no	no
19	17156540	Gaur	31	m	no	yes	9.9	15.3	1.43	no	Grade 4 Haemorrhoids	MIPH	ET	20	9	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
20	17204888	Sahana	35	f	no	yes	10.1	14.3	1.5	no	Grade 3 Haemorrhoids	MIPH	M	18	7	no	no	yes	no	4	yes	1	2	1	yes	no	no	no	no	no	no	no
21	17204787	Mahendra	60	m	no	yes	10.5	13.9	1.1	no	Grade 3 Haemorrhoids	MIPH	M	19	8	no	no	yes	no	4	yes	2	2	1	yes	no	no	no	no	no	no	no
22	17123642	Hasna	40	f	yes	no	10.8	13.5	1.5	no	Grade 2 Haemorrhoids	MIPH	M	18	7	no	no	yes	no	5	yes	1	2	1	no	no	no	no	no	no	no	yes
23	17227983	Shobha	38	f	no	yes	11.4	14.2	1.1	no	Grade 3 Haemorrhoids	MIPH	M	19	6	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
24	17128387	Sunita	31	f	yes	no	10.1	14.7	1	no	Grade 2 Haemorrhoids	MIPH	M	19	9	no	no	yes	no	5	yes	1	2	1	yes	no	no	no	no	no	no	no
25	17327088	Vijay pal	65	f	no	yes	12.5	15.2	1	no	Grade 3 Haemorrhoids	MIPH	ET	18	6	no	no	yes	no	5	yes	1	3	1	yes	no	no	no	no	no	no	no
26	17287897	Hasina	61	f	no	no	11.2	15.5	1.6	no	Grade 2 Haemorrhoids	MIPH	A	22	7	no	no	yes	no	5	yes	2	4	1	no	no	no	no	no	no	no	no
27	17268879	Kheruchand	51	m	no	yes	9.8	14.8	1.1	no	Grade 3 Haemorrhoids	MIPH	M	20	8	no	no	yes	no	4	yes	1	3	1	no	no	no	no	no	no	no	yes
28	17367988	Yasin	41	f	no	yes	10.1	14.5	1.2	no	Grade 4 Haemorrhoids	MIPH	A	18	9	no	no	yes	no	4	yes	1	3	1	no	yes	no	no	no	no	no	no
29	17389732	Daya shankar	65	m	yes	yes	8.7	13.9	1.85	yes	Grade 4 Haemorrhoids	MIPH	ET	22	7	no	no	yes	no	4	yes	1	2	1	no	no	no	no	no	no	no	no
30	17309788	Bitta	21	m	yes	no	10.1	15.7	1.5	no	Grade 2 Haemorrhoids	MIPH	M	14	8	no	no	yes	no	5	yes	1	2	1	yes	no	no	no	no	no	no	no
31	17203124	Vishal jain	33	m	no	yes	12.6	14.7	1.68	no	Grade 3 Haemorrhoids	MIPH	M	19	8	no	no	yes	no	4	yes	2	3	1	no	no	no	no	no	no	no	no
32	220515051	Gopal Sharma	38	m	no	yes	10.9	15.7	1.25	no	Grade 4 Haemorrhoids	MIPH	ET	20	7	no	no	yes	no	4	yes	2	2	1	no	no	no	no	no	no	no	no
33	220518034	Sachin	60	m	yes	yes	7.2	12.9	1.24	yes	Grade 4 Haemorrhoids	MIPH	ET	17	6	no	no	yes	no	5	yes	1	2	1	no	no	no	no	no	no	no	no
34	220518024	Chanuli	59	f	yes	yes	7.9	13.5	1.2	yes	Grade 3 Haemorrhoids	MIPH	M	19	7	no	no	yes	no	4	yes	1	3	2	yes	no	no	no	no	no	no	no
35	17252788	Harpal	62	m	yes	yes	9.3	13.6	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	30	30	N/A	N/A	yes	no	6	yes	2	4	2	yes	no	no	no	no	yes	no	no
36	17468978	Shital	33	f	yes	no	10.7	15.3	1.5	no	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	35	35	N/A	N/A	yes	no	6	yes	3	5	1	yes	no	no	no	no	no	no	no
37	17795158	Sharmishta	60	f	no	yes	11.2	12.5	1.2	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	40	30	N/A	N/A	yes	no	7	yes	2	4	2	no	no	no	no	no	no	no	no
38	17941338	Santosh	37	f	no	yes	11.5	14.7	1.5	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	28	26	N/A	N/A	yes	no	6	yes	3	3	1	no	no	no	no	no	no	no	no
39	17238879	Bifjlal	63	m	no	yes	12.5	13.9	1.2	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	45	33	N/A	N/A	yes	no	5	yes	3	4	1	no	no	no	no	no	yes	yes	no
40	17152987	Deepak	37	m	yes	yes	9.9	14.6	1.32	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	38	26	N/A	N/A	yes	no	6	yes	3	4	1	no	no	no	no	no	no	yes	no
41	17389725	Sachin	31	m	yes	no	8.7	15.3	1	no	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	28	25	N/A	N/A	yes	no	5	yes	2	3	1	no	no	no	no	no	no	no	yes
42	17238887	Pawan	39	m	yes	yes	10.1	13.1	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	44	34	N/A	N/A	yes	no	6	yes	3	4	2	no	no	no	no	no	no	no	no
43	17332488	Pratiksa	64	f	no	no	11.1	12.8	1	no	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	23	34	N/A	N/A	yes	no	5	yes	3	5	1	no	no	no	no	no	no	no	yes
44	17327389	Ramya	36	f	yes	yes	8.8	15.7	1.45	yes	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	30	33	N/A	N/A	yes	no	4	yes	2	4	1	yes	no	no	no	no	no	no	no
45	17152245	Prithvi	36	m	yes	yes	7.8	15.4	1.7	yes	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	46	36	N/A	N/A	yes	yes	5	yes	3	5	2	yes	no	no	no	no	yes	no	no
46	17256328	Gharalib	51	m	no	yes	10.2	13.9	1.4	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	28	34	N/A	N/A	yes	no	6	yes	3	3	1	yes	no	no	no	no	no	no	no
47	17113287	Khadibee	62	f	yes	yes	10.7	13.8	1.67	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	34	25	N/A	N/A	yes	no	4	yes	3	4	2	yes	no	no	no	no	no	no	no
48	17123568	Veer	49	m	yes	yes	9.8	12.8	1.89	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	60	30	N/A	N/A	yes	no	5	yes	2	5	2	no	no	no	no	no	no	yes	no
49	17237622	Iqbal	42	m	no	yes	10.1	12.9	1	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	44	32	N/A	N/A	yes	no	6	yes	2	4	2	no	no	no	no	no	no	no	no
50	17167123	Imran	34	m	no	yes	11.5	13.6	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	36	31	N/A	N/A	yes	no	5	yes	2	3	1	no	no	no	no	no	no	no	no
51	17187123	Vinit	31	m	no	yes	11.1	14.1	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	29	30	N/A	N/A	yes	no	6	yes	2	5	1	yes	no	no	no	no	no	yes	no
52	17121387	Soumya	33	f	no	yes	10.9	15.3	1.1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	36	28	N/A	N/A	yes	no	7	yes	2	4	1	no	no	no	no	no	no	no	no
53	17151276	Ramveer	62	m	yes	yes	9.8	15.2	1.66	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	46	33	N/A	N/A	yes	no	6	yes	2	5	2	no	no	yes	no	no	yes	yes	no
54	17113261	Shikha	36	f	yes	yes	10.1	14.7	1.65	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	65	37	N/A	N/A	yes	no	5	yes	2	4	1	no	no	no	no	no	no	no	no
55	17112368	Ramesh	45	m	yes	yes	8.6	13.6	1.68	yes	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	55	25	N/A	N/A	yes	no	4	yes	3	3	2	no	yes	no	no	no	no	no	no
56	17125876	Pj Sindhu	47	f	yes	no	10.6	12.8	1	no	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	46	38	N/A	N/A	yes	no	6	yes	3	4	1	yes	no	no	no	no	no	no	no
57	17152682	Kamlesh	43	f	no	yes	11.4	14.6	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	38	30	N/A	N/A	yes	no	5	yes	3	5	2	yes	no	yes	no	no	no	no	yes
58	17187236	Bipin	38	m	yes	yes	8.6	15.4	1	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	36	31	N/A	N/A	yes	no	6	yes	2	4	2	no	no	no	no	no	no	yes	no
59	17183688	Chatrapal	46	m	no	yes	11.1	14.2	1.2	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	23	29	N/A	N/A	yes	no	3	yes	4	3	1	no	no	no	no	no	no	no	no
60	17167123	Ravinder	28	m	yes	no	10.7	13.9	1.67	no	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	42	27	N/A	N/A	yes	no	6	yes	2	4	2	yes	no	no	no	no	no	no	yes
61	17189712	Sunil	58	m	no	yes	10.1	13.1	1.1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	44	32	N/A	N/A	yes	no	6	yes	4	5	2	no	no	no	no	no	no	no	no
62	17189237	Farah	26	f	yes	yes	7.1	14.6	1.3	yes	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	56	30	N/A	N/A	yes	yes	8	yes	2	5	2	no	no	no	no	no	no	yes	no
63	17123985	Jasbir	53	f	yes	yes	8.7	15.9	1.85	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	54	32	N/A	N/A	yes	no	7	yes	4	4	1	no	no	no	no	no	no	no	no
64	220514064	Padma	54	f	no	yes	10.3	15.1	1.1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	53	28	N/A	N/A	yes	yes	6	yes	2	4	1	no	no	no	no	no	no	yes	no
65	220511676	Kavinder	39	m	no	yes	11.3	12.7	1.2	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	45	29	N/A	N/A	yes	yes	5	yes	2	5	1	no	no	no	no	no	no	no	no
66	220512031	Dheeraj kumar	40	m	no	yes	12.7	12.9	1	no	Grade 4 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	42	31	N/A	N/A	yes	no	6	yes	1	3	2	yes	no	no	no	no	no	yes	no
67	220507063	Chanda	33	f	no	yes	10.9	13.7	1	no	Grade 3 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	46	30	N/A	N/A	yes	no	6	yes	4	5	1	no	no	no	no	no	no	no	no
68	17328736	Kaustabh	23	m	yes	no	8.4	14.7	1.68	yes	Grade 2 Haemorrhoids	Conventional Hemorrhoidectomy	N/A	44	28	N/A	N/A	yes	no	5	yes	3	3	1	no	no	no	no	no	no	no	no